COMPUTERWORLD

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NEWSPAPER



An Avoidable Site?

Misshapen tape drives, a charred console and a melted telephone lie among the ruins of a room that was once a data center. The National Fire Data Center will soon provide information designed to help firefighters minimize scenes like this. See story on Page 5.

Switched Network Service For Banking-Type Usage In AT&T's Near Future

By Ronald A. Frank
Of the CW Staff

MORRISTOWN, N.J. – AT&T is planning to introduce a transaction network service that will provide banking-related capabilities, according to Edward Goldstein, AT&T director of product management.

The network, which will provide electronic funds transfer types of services including credit authorization and check cashing, will be a switched service providing users with access to various data bases, Goldstein said during a recent interview.

The switched network service will probably be accessed through a new model of the Bell Transaction Telephone and may initially be offered late this year on a local intrastate basis, he added.

The intrastate service would not be an attempt to avoid the interstate jurisdiction of the Federal Communications Commission (FCC), but rather would be a response to the demand for localized switched transaction services, he said.

AT&T is exploring the possibilities of this service with several customers and plans eventually to expand the transaction network to an interstate offering, Goldstein stated.

The transaction network will be accessed on dial-up lines using the new model of the Transaction Telephone. Through special switching arrangements, calls would be routed through the network to user credit and other data base CPUs, he explained.

The network will use existing Bell System transmission facilities but employ specialized switching points to configure the banking transaction service, he said.

Other Possibilities

AT&T could provide many other types of "communications processing" services, Goldstein said, including offerings to perform line control, CRT formatting, editing and error control.

In his opinion, the teleprocessing access method would fall within the category of functions covered by communications processing, he said.

The DP user who has remote terminals would welcome additional communications capabilities for this equipment. One

(Continued on Page 4)

At U.S. vs. IBM Antitrust Trial

RCA Head Says IBM Did Not Cause Exit

By Edith Holmes
Of the CW Staff

NEW YORK – Nothing IBM or any other company did forced RCA out of the computer systems business, the president and chief executive officer of that corporation told the court hearing the U.S. government's antitrust case against IBM here last week.

Echoing the testimony of General Electric's chairman and chief executive officer last December [CW, Dec. 17], Anthony L. Conrad appeared as a witness on behalf of the government in the market definition portion of its case dealing with what has come to be known as "The RCA Story."

The decision to exit was based on the deterioration of revenues as a result of the state of RCA's computer business by 1971 and on the softening of users' desire for the products RCA had to offer, according to Conrad. These factors pushed RCA's projected break-even point from the mid- to the late 1970s.

Better Use for Resources

RCA management decided it could apply the resources going into computers into other elements of its overall business which would achieve profitability sooner with less risk, Conrad said. The corporation was also concerned about starving some of its historical concerns – like color TV – and about having sufficient funds for new areas in communications and satellites..

Had RCA remained in the business of manufacturing and marketing computer systems, Conrad testified, he believed the corporation would eventually have achieved profitability in this area.

RCA could have raised the necessary capital to finance its development plans for the business, he added, but as long-term investments, the development of an Alaskan common carrier system, the growth of RCA Global Communications and the creation of Videodisk and Selectavision were more promising.

With RCA since 1946, Conrad came up through the service organization of the corporation, becoming its president in 1960 and its executive vice-president in 1969.

Elected to RCA's board of directors in 1970, he was named president of the corporation in June 1971 and assumed that office on Aug. 1; RCA exited the computer business on Sept. 17.

In his brief association with the industry and RCA's involvement in it, Conrad said he studied his corporation's position and that of its competitors. The first and foremost of RCA's competitors was IBM, he stated, adding RCA believed IBM to be the largest, most successful company in the business.

Conrad said he believed IBM to be a

(Continued on Page 7)

SDI Puts Unmodified DOS/VS on 360s

By Don Leavitt
Of the CW Staff

BURLINGAME, Calif. – VOS/360, now available from Software Design, Inc. (SDI), acts as a transparent interface between IBM 370 software and 360 hardware, making is possible for users to run unmodified DOS/VS software on 360 mainframes, according to SDI.

Since VOS/360 works outside the operating system itself, all releases of DOS and DOS/VS can be used, SDI said.

Itel, Inc. also offers a software package supporting use of 370-oriented DOS or DOS/VS (through all releases) and related application programs on 360 equipment, but that vendor has modified the DOS/VS supervisor so it does not include 370 instructions.

VOS/360 resides in upper memory and takes control of the system when interrupts caused by identification of 370 instructions occur. The SDI software simulates 370 hardware functions, including the extended instruction set, control registers, time-of-day clock and block multiplexer channels, a spokesman said.

The block multiplexer simulation feature allows users to add IBM 3330 or equivalent disk drives to their 360s to gain the storage capacity and speed of such drives. SDI does not, however, provide the controllers required for such a hookup, the spokesman noted.

The software requires between 4K and 10K of main memory, depending on options selected, he said. Support for DOS/370 without virtual storage – for IBM's Release 27, for example'– can be handled in 4K; basic DOS/VS takes 6K minimum.

Floating-point arithmetic, decimal arithmetic, interval timer support and the block multiplexer simulation are optional. In all cases, the options are available in the VOS/360 package as delivered.

The user may generate just those features required for a specific installation without tying up core for logic that can't be used, SDI explained.

Dynamic address translation, a require-

(Continued on Page 4)

Honeywell, NCR Admit Payments

By Molly Upton
Of the CW Staff

Honeywell, Inc. and NCR Corp. have joined Burroughs Corp. in acknowledging unauthorized payments abroad.

The firms reported taking measures to ensure adherence to corporate policies after various legal and audit teams discovered the payments.

Burroughs said the amount involved in unauthorized payments abroad by an undisclosed foreign subsidiary was $2.1 million, rather than a previously announced $1.5 million [CW, Feb. 2].

Honeywell weighed in with about $1.8 million in payments which were "at variance with company policies," while NCR discovered payments it estimated to be between $300,000 and $500,000.

A Burroughs spokesman explained most of the difference between its two announcements stemmed from scrutiny of 1972 records, which revealed $226,000 in payments, whereas the previous announcement dealt with documents from 1973 to 1975.

Most of these transactions occurred under the cover of increased sales prices, the Burroughs spokesman said.

Honeywell said the payments occurred between 1971 and 1975 and were made by subsidiaries in a number of countries outside the U.S.

The payments were made in connection with specific sales to customers in the

(Continued on Page 2)

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Hopes to Act as Catalyst

Adapso Offers to Help EFTS Commission

By Molly Upton
Of the CW Staff

MONTVALE, N.J. — The Association of Data Processing Service Organizations (Adapso) has offered to help the National Commission on Electronic Fund Transfers in its studies on the impact of electronic funds transfer systems (EFTS).

William W. Fletcher, chairman of Adapso's EFTS committee, said Adapso can provide views from various segments of the services industry, such as batch, software and network time-sharing.

Adapso hopes to act as a catalyst for gathering ideas from these sectors and reviewing the commission's ideas, he said.

Adapso has reconsidered its previous objection to the lack of technical background among commission members because the commission has indicated it would be interested in Adapso's views and working with Adapso over the two-year period of its existence, Fletcher said.

"We do intend to work as closely as possible with [the commission] in a very cooperative attitude," Fletcher said.

"It appears the commission will rely on the subcommittee approach, and the input various segments of the industry will be able to make through this approach will be just as good," he said.

The commission has not formed subcommittees yet, but is first "taking the temperature of the water" to find out who would be impacted if the government were permitted to have a national switching network, for example, he said.

Planning Member Poll

Adapso will be polling its members to determine how they perceive EFTS' impact on their business and Adapso's thinking on various issues regarding EFTS and right of privacy, audit and procedural safeguards and regulatory aspects as well as technical issues.

"Taking a poll would be easy if we were to confine it to those in the on-line business, but the impact is going to cross every line of the computer services industry, including software and even those that do strictly payroll and accounts receivable," Fletcher said.

"We don't want to pretend we're doing the whole study," Fletcher said, "but we do want an opportunity to have an audience and assist them in developing their search."

Fletcher indicated to the EFTS commission chairman and executive director that Adapso members could participate in technical groups looking into such areas as standards, formats and identification procedures.

He outlined these areas as including reviewing standards and specifications for common access to fund transfer networks by a variety of computers and common formats for transmitting data and identifying participating institutions and their DP service organizations.

Other areas include definition of encrypting or encoding for plastic cards and for transmission and automatic mechanical devices and their 24-hour linkage to a CPU. Plans also need to be made for downtime or off-line operations, Fletcher suggested.

Other areas in which Adapso members could help include interfacing point-of-sale terminals through common switching networks into computers or service organizations of many different financial institutions.

Work needs to be done on identifying the volume and clearing problems expected in recurring direct deposits by governmental and large corporate units, he said.

This also affects the legal and monopoly aspects when one large bank becomes the beneficiary of huge direct deposit machinery, Fletcher observed.

He suggested studying anticompetitive implications if a federal regulatory agency attempts to preempt a funds or DP service.

Honeywell, NCR Admit Payments

(Continued from Page 1)

public and private sectors or to expedite official actions affecting the subsidiary involved, rather than to secure favorable treatment to which the company was not otherwise entitled, the firm said.

In many cases the payments were in return for services actually rendered, and all payments were reported in the financial records of the company, Honeywell said. No revisions are required in its U.S. tax returns.

Honeywell's policies relating to standards of business conduct were a major item on the agenda of a recent meeting of all managers from its worldwide operations, and the general managers were charged with seeing that the policies were known and understood by all concerned, the firm said.

NCR Statment

NCR filed a statement with the Securities and Exchange Commission (SEC) acknowledging some of its foreign operations had been inflating the purchase price of equipment and paying the excess amounts to individuals inside and outside the country of purchase.

Chairman William S. Anderson ordered an immediate cessation of the practice, and the board of directors formulated a written policy prescribing a code of conduct.

The code, which requires an annual certification of adherence, was sent to key officials in the U.S. and abroad.

The former practice was devised and controlled by officials of the company's foreign operations, a number of whom have left the company, NCR said.

The announcements are a result of a current trend by large U.S. firms with business overseas to divulge contributions that are at variance with company policies and/or with SEC regulations.

At other companies, IBM said no significant results were found from its usual audits by both internal and independent auditors as well as from additional audits in virtually every country in which the firm operates.

A Digital Equipment Corp. spokesman said the firm has not to his knowledge conducted any special audits. But, he added, it has always maintained a preventive rather than remedial approach to the issue of indiscretion. "We sensitize our people to the potential problem," he said.

Control Data Corp. is conducting a study of its worldwide operations to determine whether any kind of improper payment practices exist, a CDC spokesman said.

A Univac spokesman said Sperry Rand Corp. Chairman J. Paul Lyet has indicated that firm has found no evidence of illegal payments.

On the Inside This Week

NEWS
Users Report Some of First PDP-8s Continue to Work 8
Seminar Set To Teach Students DP Problem Solving 9
Micro Era Predicted to Find Way Into Many Homes 10
Ensuring Competition Seen as Users' Responsibility 11
County Makes Clerk Retrieve DP Birth Records 14
Next ICCP Goal Seen Promoting CDP 15

EDITORIAL
Editorial: Another Inquiry Needed 16
White Hat, Black Hat: Oh, What a Tangled Web 17
Taylor Report: Mailing Foul-Ups No Laughing Matter 17
'Bubbles' Finds Government Money Both Boon, Bane 18

SOFTWARE & SERVICES
'DBMS' to Run Seminars, Publish Newsletter, Guide 20
Chase Data Bases, 'Dissplа' Now on Interactive Net 21
Site With DBMS Finds Shift to 370 Easy 22
Knowing Company Needs Key to Choice of Best DBMS ..23
Right JCL Entry Choice Important to Gain RPS Benefit ..24

COMMUNICATIONS
On-Line Net Helps Small Businesses Afford DP Power 25
Going On-Line a Venture to Approach With Caution 27
Adds Consul 890A Works With IBM 3 28
Users Planning Nets Advised to 'Go for the Minimum' 29

SYSTEMS & PERIPHERALS
APS Not Indicative of Next Generation 31
Use of Graphic Input Device Lets Firm Reduce Staff 34

MINIWORLD
DG Unveils 16-Bit Micronova Family 37
'Prism' Keeps Eye on Optical Laboratory's Operations ...38
Mini Makes Commissary Accounting More Accurate 39
Trial and Error Leads Firm to Mini 40
Turnkey Answer to Rising Service Costs 41
MPA-1 Tests, Debugs Micro Hardware, Programs 42

COMPUTER INDUSTRY
Adapso Opposes Banks in DP Services 43
GSA Extends Infonet Pact; Outlines New Bidding Plan ...43
Orders for Tandem 16 Ahead of Plan 44
Shipments of 3000 to Triple in 1976 47
Seven Amdahl 470V/6s Installed; More Expected 50
Terminal Makers Report Upsurge in Sales 51
Cost of 360/67 Software Quintupled 53

FINANCIAL
Four of Six Remote-Computing Firms Come Out Ahead ..62
Quarter Helps Tally Report Record Year 62

Users Urged to Sidestep Transaction-Priced Services

By Esther Surden
Of the CW Staff

NEW YORK – When dealing with a service bureau, "never negotiate transaction prices," Norman Laskin, director of MIS for Herman's World of Sporting Goods, told a Computer Caravan workshop here last week on computerizing small organizations.

"I will never negotiate transaction prices," Laskin said, noting he stays away from this type of pricing, which is dependent on the number of transactions made.

Instead, he prefers a fixed monthly cost because when "dealing with X Service Bureau, I know that Y dollars are constant throughout the year," he said.

When asked what a reasonable cost would be, Laskin said "as a user, you should have some idea of your volume" and have a cost level in mind.

General batch-processing services offer a package type of service, he explained. The user must supply the source documents; in return, he gets the output reports.

One of the main problems with this type of service is that the user loses control of his own operations, he said, adding he had experienced instances in which a bureau lost a user's cards and documents and said it never received them.

The second type of service bureau is a special application type, Laskin said, that offers specialized types of reports to the user.

On-Line Expensive

On-line processing is another type of service bureau offering. On-line means "I will be in direct communication with some kind of computer," Laskin said, and is related to the distribution end of a business.

On-line applications are very expensive because of communications costs for connecting the on-line capability to the computer, he said.

"This makes on-line processing immediately suspect," Laskin told the group. "Any time you use the telephone company, you have to be careful, because it usually fails."

Sometimes an in-house terminal is tied to a concentrator linked to a large mainframe, Laskin said, making the opportunity for communications breakdowns apparent.

Another type of service bureau includes on-line entry edit. This allows the user to enter the data and find out if it's good before he transmits it to the service bureau and gets his report back.

The last type of service is time-sharing, popular in companies that are financially oriented, Laskin said.

"Here you get involved with programming development and charges based on connect time and storage usage," he told the group. With time-sharing, the user puts in the parameters of the report and gets "quick formatting of complicated reports," he added.

When to Use Bureau

"When should a business consider using a service bureau?" Laskin asked, then answered, "When you have an overload on your own computer," no expertise in the necessary application, special hardware requirements for that application, a need to test new applications and a need for security of certain information, such as payroll.

"Many a firm has written off their company because they went to an in-house computer too soon," Laskin warned the attendees. "Maybe your volume is too low or your company is so small you can't justify $1,000/mo."

Users should not consider in-house computing if they have no in-house DP personnel and no space to put the computer, if the business is totally decentralized or if the business' fixed costs are too high, he said.

The fixed cost of a service bureau is low and the costs of an in-house system are high. However, if the business is growing, the costs of a service bureau can be variable, he said.

"All of a sudden, instead of being $100/mo, it's $1,000/mo," he said. The variable costs of an in-house system will be lower because "it's easier to adapt to change."

With a service bureau, the user needs no in-house personnel, he noted, but with a mini the firm may have to hire someone to run the system. The in-house computer also requires some space, while a service bureau obviously requires none, he said.

Throughput is sometimes poor with a service bureau, Laskin warned, but "when you have your own computer, if you can't get good turnaround, you should fire your computer manager."

CW at Caravan 76

Seminars on DP Set For Hearing-Impaired

WASHINGTON, D.C. – Two special sessions on DP for deaf and hearing-impaired government employees will be held here soon by the ADP Management Training Center of the U.S. Civil Service Commission.

The first, "An Introduction to DP," is scheduled for March 29-April 2. Its objective is to provide an understanding of DP concepts and can be used as either a stand-alone introduction or a foundation on which to build a DP education program, the center said.

"Fundamentals of Fortran IV" will be held April 6-15. This session is meant to provide participants with a working knowledge of Fortran; upon completion of the course, students should be able to code and debug programs of moderate complexity, according to the center.

The courses will be taught by professional DP instructors and simultaneous translation to sign language will be used. Most of the material presented will also either be developed on a chalkboard or displayed on a screen.

Only deaf and hearing-impaired government employees are eligible. "Introduction to DP" costs $200 and the course on Fortran is $410.

Further information is available from the U.S. Civil Service Commission, Bureau of Training, ADP Management Training Center, Washington, D.C. 20415.

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Bell Net to Handle Bank-Type Services

(Continued from Page 1)

type of communications service which would make it easier for the user to implement multiple applications on the same mainframe is now under study by AT&T, Goldstein said.

"Users might welcome some alternatives to what they have now, and this is not an unreasonable business for the telephone company to get itself into," he said.

The clustered version of the Dataspeed 40 terminal operates with binary synchronous communications protocol and it is probable AT&T will offer terminals compatible with other protocols, he indicated.

"If there is a need for [other protocols], I don't see why we should be locked into a particular protocol," he said.

But there is no requirement that the protocol used between the CPU and the network be the same protocol used on the network. And it is feasible to have networks that will perform protocol conversion as well as speed and code conversion, he said.

Asked whether this implied the phone company might offer switching processors to be used as front ends between a DP center and a network, Goldstein said there were no plans to offer such devices, but "it is conceivable."

Many communications networks today support multiple interchanges between the CPU and the remote terminal which could be performed more efficiently, Goldstein said.

"To most users, communications is a nuisance; it is something they have to do, but they are more interested in the application," he said.

In today's communications networks, the cost of long-haul transmission between the network nodes is not the major part of the costs -- access is, he said. There is more that can be done to make access into and out of a network more cost-effective than there is in the internode trunking, he added.

If today a user needs two terminals and dual network access paths for two applications, it is possible to have a multiuse terminal with a single access to perform the same functions at less cost, he said.

Dataspeed Ruling

The recent FCC ruling that the clustered, binary synchronous version of the Dataspeed 40 is a DP device [CW, March 8] has serious implications, Goldstein said.

It may reopen the inquiry into where communications services leave off and DP services begin, he said, but hopefully the FCC will not launch another full-scale inquiry.

Such a proceeding would take a long time and might impact the services now being planned by Bell, he indicated.

"We have to understand the user's problems much better than we ever did before. There are lots of terminals and lots of transmission methods around, but what is needed is to put these together into cost-effective systems for the user," Goldstein said.



CW Photo by F. Frank

Edward Goldstein

'VOS/360' Lets Users Run DOS/VS on 360s

(Continued from Page 1)

ment of any VS environment, is handled by the VOS/360 logic, but there is no paging. Programs run in Virtual-Real mode and users must have enough memory for their programs.

Assuming they have sufficient real memory, users can utilize all five partitions allowed DOS/VS sites, rather than the three to which they are limited under DOS/360, SDI said.

VOS/360 is currently available only to new or current users of SDI's Grasp or Grasp/VS, although it does not depend on the logic in either of those packages. That prerequisite rents for a minimum of $152/mo, SDI said.

VOS/360 is available on a rental plan for $1,725/mo. SDI is at 880 Mitten Road, Burlingame, Calif. 94101.

Originally developed to help Itel move its inventory of IBM 360s, that vendor's software has been available to any installation that wanted it since the first of the year for prices ranging from $600/mo on a 360/30 to $1,200/mo for a 360/50 or 65 or a 370/155, Itel said.

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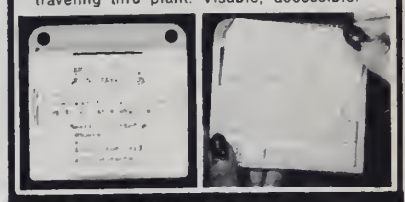
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By Gathering, Analyzing Statistics

National Data Center Aims at Cutting Losses by Fire

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. – The newly created National Fire Data Center (NFDC) here is a computer user serving another set of users – fire fighters and, through them, everyone living in the U.S.

The center was designed to provide an accurate picture of the national fire experience; to identify acute problem areas in fire fighting and prevention and to establish priorities for approaching them; to determine possible solutions to these problems; and to monitor and measure the effectiveness of any program designed to reduce fire losses.

One of four programs conducted under the auspices of the U.S. Department of Commerce's year-old National Fire Prevention and Control Administration (NFPCA). the data center relies on a CPU already in place at the Commerce Department and will employ off-the-shelf programs whenever possible, according to B. William Rock, the center's associate administrator.

"We would never want to develop a program just for the center," he said. "We're serving an action-oriented clientele.

"I'm sure there will be iterations of this system, but right now we're trying to get data out to the people who need it as soon as possible," he added.

To fulfill the NEDC's designated functions, Rock and his organization will support and assist NFPCA, state and local governments, fire services and the fire industry as a whole in meeting a congressional mandate to cut death and injury by fire in the U.S. in half over the next generation. At present, fire kills 12,000 and scars and injures 300,000 Americans each year.

Emphasis on Prevention

"The emphasis in fire fighting has been on the suppression of fires once they've started; it should be on fire prevention," Rock said.

"The common thread running from our operation to that of the local fire company is an awareness we all lack the data necessary to make good decisions both in fighting and preventing fires.

"Even the definition of 'fire' is in dispute," he added. "In that sense, fire fighters want to see the data center operating just as badly as we do."

The data center has been working on the program development for a national fire data system since early last summer, according to Rock. Based on the Fire Incident Report, the data collection system depends on information gathered from state or fire organizations.

"There isn't any way we can receive reports from the 23,000 to 25,000 local fire departments in this country," Rock said. "So the center is relying on cooperation from the states."

Before the National Incident report was developed, there was no standard method for fire reporting, he added.

Working with National Fire Prevention Association's 901 Committee, a standards reporting group, the NFDC talked to the fire community itself to find out what kind of information was most needed. Some 60 data elements, ranging from the day a fire occurred to the item first ignited and the amount of resultant damage, were isolated.

The data center itself will use about 40 of these elements in the form of the reports it makes to the states, but all 60 can be employed by the states and localities if they desire.

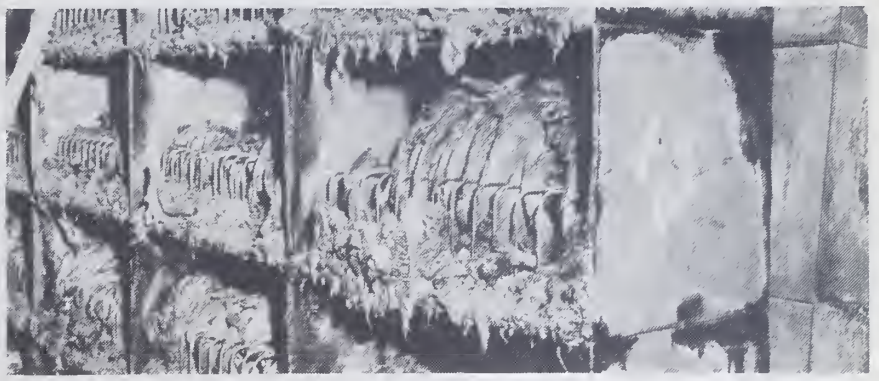
Required to analyze as well as process data, the center will play these 40 data elements against each other in different ways in order to identify fire patterns that might lead to fire prevention, Rock explained.

"In order to make truly national estimates, we are also developing a National Sample of reporting jurisdictions, from which extrapolations can be made on the total fire problem in the U.S.," he said.

The system hasn't collected its first scrap of data yet, Rock noted. But before NFDC was formed, the reporting system was prototyped at the National Bureau of Standards, "so we know it works."

In addition to gathering and analyzing statistical fire data, the center will also collect and make available information on the fire properties of materials and fire codes and regulations. Injury rate information is being collected from the Con-

(Continued on Page 7)



Neither a free-form sculpture nor a scene from "The Twilight Zone," this tape library illustrates what could happen if proper precautions against fire aren't taken. A national data center, barely a year old, hopes to provide information that will help cut loss of life and property by fire during the next generation.

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RCA Head Blames Exit on Revenue Losses — Not IBM

(Continued from Page 1)

well-managed company and noted its sheer size and success was a key factor in the RCA exit decision because it provided an example of the scope of investment RCA would require to achieve a similar position.

IBM's presence simply meant RCA would have to be extremely efficient, he said.

The RCA executive also told the court there seemed to be no time in the future when IBM's position would be challenged – RCA was uncertain when, if ever, the Department of Justice would act in the antitrust case against IBM.

When he began his study of the corporation's position in the industry, Conrad indicated, he was initially concerned only with the feasibility of RCA's 1971 business plan for the Computer Systems Division. It wasn't until the second week in August that he learned of any move to leave the industry.

$703 Million Infusion

To achieve projected revenues for 1975-76, the business plan called for an infusion of $703 million between 1971 and 1976, Conrad recalled when he examined the plan. By 1971, the computer business at RCA had not been profitable in any year of which he was aware, he said.

At one point – 1967 – the corporation thought computer systems might eventually be bigger than color TV, an RCA annual report introduced into evidence indicated. But by 1971, RCA's aggregate pretax losses since 1950 were estimated to be between $328.3 million and $336.3 million.

RCA's goals to have a 10% market share and to be number two in the industry were already well-entrenched as division and corporate objectives when Conrad became president-elect of the corporation in June 1971, he said.

He stated he didn't know why RCA sought to be number two in the industry and thought that, while the task was achievable, it could not be realized without a tremendous effort.

Ultimately, Conrad said, his study of the computer business led him to recommend to the board of directors that RCA exit the industry. In describing for the court the details of the meeting RCA's board of directors held on Sept. 17 to effect that decision, Conrad noted the board's charge to him to make that exit as smooth as possible for RCA's Computer System customers.

There were two serious offers for RCA's customer base – from Univac and Mohawk Data Systems, Conrad said. There were a number of other interested buyers, he added, listing Burroughs, Xerox, Memorex and a Texas firm.

Univac and Mohawk were considered from late September to early October 1971, he said. Univac was finally selected for the sale because RCA believed that firm would serve RCA customers well, could handle the myriad of transactions that would be required to switch customers from RCA to Univac and was better able to pay the sums of money it offered to pay.

Conrad noted repeatedly during questioning by the government and by IBM that the Computer Systems Division was only one aspect of RCA Corp.'s total interests with which he had to familiarize himself after his election as the corporation's president.

He stated he spent 10 full days and several others part-time becoming acquainted with RCA's holdings and operations in computers.

Many of his conclusions were based on a variety of analyses and reports he requested be drawn up for him by RCA's financial staff, headed by Chase Morsey Jr., and by members of the Computer Systems Division, led by L. Edwin Donegan.

Neither Morsey nor Donegan are on the government's witness list; Donegan is scheduled to appear as part of IBM's defense.

National Data Center Hopes to Cut Fires' Effects

(Continued from Page 5)

sumer Product Safety Commission's National Electronic Injury Surveillance System and mortality statistics are available to the center from the National Institutes of Health's National Center of Health Statistics.

Eventually, Rock hopes to have the participation of industrial groups in this effort as well.

"The center also plans to collect quantifiable data from foreign countries so we can compare U.S. fire experience with foreign fire experience," he said. Preliminary discussions have been held with foreign reporting organizations to develop an international fire incident data exchange program.

Beyond the development ot the data elements to be used in the national incident reporting form, NFDC has created training materials and computer programs for use by the states that will participate in the reporting system.

"Programs will be kept simple and will permit states to output reports for their own use and to forward data to the national center for further analysis," Rock stated.

Additional incentives for encouraging states to participate in the program are technical assistance and report forms from the administration, he said.

He added there will be a little one-time seed money available to the states for computer costs, particularly data conversion expenses. "We are quite willing to cost-share with a state planning a system if that will help get the job done."

At this point, the National State Sample has been selected and includes 19 states. In addition, efforts are under way to obtain written agreements between the center and participating states.

Rock noted seven states in the sample have verbally indicated their desire to contribute data to the program. "We expect 12 states to enter the system by the end of 1976," he added.

He estimated it will be three to five years before his staff will be able to talk to all 50 states and four U.S. territories about their participation in the reporting system. Rock's staff will number 22 by June.

All of the center's processing has been and will continue to be accomplished on the Commerce Department's IBM 360/65, according to Tom Collins, NFDC director of computer operations.

Programming for the system will be done in Cobol, and the data base management system employed is Computer Corp. of America's Model 204. Information from the states will be sent to the center on tape.

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Ten Years After Introduction

Users Report Some of First PDP-8s Continue to Work

By Esther Surden
Of the CW Staff

Ten years after the official introduction of the Digital Equipment Corp. PDP-8, some of the first machines are still operating at user sites.

The old minicomputers are, in many cases, still doing the same jobs they were purchased to do. And all of the users reported they have found system reliability to be high in the years they have worked with the machines.

Most of these PDP-8s were bought for laboratory applications; some were prototypes, delivered before the mini's formal 1965 introduction. Software has been modified and memory upgraded on some, and additional storage has been added to others.

Line Model

Dr. Thomas W. McIntyre, associate professor of biophysics at the University of West Virginia Medical Center, has worked with a PDP-8 since 1967.

That model was a Linc 8, he said, a combination of a PDP-8 and a Linc processor. The configuration purchased included a display, two dual Linc tapes and 16 channels of analog-to-digital converter.

The system is still doing the same "smart" feedback experiments it did when it first arrived, even though it is now located at the Los Angeles County Heart Laboratory of the University of California at Los Angeles, he said.

Another long-time PDP-8 user, Robert Hassinger, recalled he received his system in 1968 when he worked in Baltimore for a real-estate firm.

The firm used the 4K mini to keep track of available real estate, he said, and it is still being used for that purpose.

Now working for Liberty Mutual, an insurance company, Hassinger said that firm has a PDP-8I it received in 1968. It began with a 4K system with a teletypewriter and ran Focal on it to make it a useful configuration. The system was used to support calculations for statistical analysis.

Liberty Mutual's PDP-8 has been upgraded to a 32K system with card reader, plotter, disk and a high-speed paper tape reader, he said, and can do "just about anything, including act as a laboratory interface for real-time nursing analysis."

As for the future of the system, "the 'eight' has kept up with expanding applications, even though people were predicting its death when the PDP-11 came out. This is due to the variety of software available," Hassinger added.

Reasons for Success

John Alderman, president of Digital Communications Associates, a firm that uses its PDP-8 as part of data communications systems, began working with a PDP-8 in 1965. Alderman even went to school to learn how to fix the machines.

The original system was used in physics experiments by his former employer, who is "certainly using the 'eight' for the same purpose," he said.

The success of the system, Alderman said, is that there are so many in the hand of so many users that "an incredible amount" of useful software and interfaces are available for the machine.

Another user, Roger Anderson of the Lawrence Livermore Laboratory in California, said he got his first PDP-8 back in 1964. The system was used to control a machine that measures crystals to determine their structure.

Most of the early work was concerned with the control of instruments, he added. This system is still doing the same types of experiments it did before although software has been enhanced.

Calling the PDP-8 "bit-efficient for small applications," Anderson said the laboratory has another very old PDP-8 that is used as a general-purpose laboratory system with disk, paper tape, punched tape, line printer, a California Computer Products, Inc. plotter and an oscilloscope. The system is used for trying out new concepts, teaching and developing experimental techniques.

The first two PDP-8s arrived at the School of Physics at the Georgia Institute of Technology in 1968, according to Dr. N.S. Kendrick Jr., assistant professor of physics. They were known as Classic 8s and were "the first computers under $20,000 that would run anything that we needed." The school used the system to run nuclear experiments.

When the system was first installed, it had 4K core and 32K disk, but was upgraded shortly thereafter, he said. Now, because of a capability added in 1970, the system runs the experiments in foreground while the background is used for program development, he said.

The second machine also had 4K core and 32K disk, he added, and was used to do crystal X-ray experiments. It is still being used for the same purpose, although the software has been modified and the system has been upgraded.

"The 'eight' is a well-built machine and we've given it TLC," he said.

There is another old PDP-8 in the School of Physics, he added, bought used from DEC, that is used as a spare parts bin.

They can't all keep running.

Service Bureau Head Still Sought

KENTWOOD, Mich. – A leased Thunderbird allegedly operated by James Robert Redican, alias Thomas Redican, president of Computer Payroll and Accounting Services of Grand Rapids, was found at the Detroit International Airport recently, but the man and his wife are still missing.

Redican, who has been charged with issuing thousands of bad payroll checks to his customers' employees [CW, Jan. 26], is believed to have arranged a private flight "out of the country," a spokesman for the Kentwood Police Department said.

Redican is wanted on charges of embezzlement by misappropriating the money of 300 to 400 clients, a state offense, and for unlawfully fleeing the jurisdiction to avoid prosecution, a federal offense, according to Assistant Kent County Prosecutor Donald Johnston.

The automobile was discovered as a result of a tip, the detective said.

Redican's three-year-old daughter is still with relatives in Lansing, and no apparent attempt has been made to contact her, the spokesman said.

A guide through the Hardware Jungle

How to hunt big gains and avoid white elephants - in our March 29th report on "Stretching Your Hardware Dollar."

If you're shopping around for a way to increase your system capacity without moving up to a much bigger and much more expensive mainframe, then you've probably found that there's no "bargain basement" in DP. Instead, there's a hardware "jungle" of vendors, lessors, systems and peripherals. Most of them are, ostensibly, designed to deliver the added computer power you need for a fraction of the cost. But will they leave you out of the industry mainstream later on? Can enhancements really pay their own way? We'll be taking an in-depth look at questions like these in "Stretching Your Hardware Dollar," appearing in the March 29th issue of *Computerworld*.

Edited by Patrick Ward, this supplement will be filled with application stories and "how-to" tutorials on the ways you can save money choosing and acquiring hardware. We'll look at used machines, minis for offloading applications, and enhancing your systems with independent vendors' memory and peripherals. We'll show you ways to decide how many peripherals you need, and how to determine whether proposed enhancements will pay their own way. The supplement will report on what computers are moving in the used equipment market, and give you advice in looking for leasing opportunities.



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Summer Seminar Set To Teach Students DP Problem Solving

NEW YORK – High school students from this area will have an opportunity to solve real-life problems with the aid of computers this summer at the Polytechnic Institute of New York.

The seven-week seminar and workshop, titled "Technology and Society – System Analysis and Simulation" and beginning June 28, is supported by a $21,000 grant from the National Science Foundation. Seventy students will be chosen to participate.

The students will receive a grounding in both digital and analog computers and then set about solving problems of their own choosing. They will spend the first week at Polytechnic learning Fortran (those who are already familiar with this language can choose to learn another or advanced Fortran techniques).

Classes, workshops and discussion groups will run from 9:30 a.m. to 5 p.m. five days a week.

Modeling Techniques

Later, they will study a variety of mathematical modeling techniques so they can simulate real-life situations using a computer. As the students learn new theories and techniques, the faculty will present demonstrations applying what the students have learned.

Last summer, students worked on projects simulating an attack on Brooklyn by biological warfare, fission and fusion reactions, an epidemic, airport operations, economic systems, optimal traffic light timing, galaxy evolution, parking lot usage and the human thought process.

Like Master's Work

"We select the very best students in mathematics and science. In fact, some of these kids did work equivalent to a master's degree program," according to Prof. Michael Rabins, who directed the program last year.

Students will be chosen on the basis of their high school record, Scholastic Aptitude Test scores and letters of recommendation from high school science or mathematics teachers.

Scholarships Available

There is a $150 tuition fee for the course, but full and partial scholarships will be available for students who need financial support. "No qualified applicant will be barred from participating in the program due to his family's inability to pay the tuition," Dr. Norbert Hauser, director of this summer's program, said.

Students in the program will use Polytechnic's IBM 360/65 computer, a variety of analog computers and, through remote access terminals, Digital Equipment Corp. minicomputers.

Further information on the program is available from Hauser at Polytechnic Institute of New York, 333 Jay St., Brooklyn, N.Y. 11201.

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  - The Role of the Data Base Management Package
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  - The Data Base Task Group Recommendation
  - Package Descriptions
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- DATA COMMUNICATIONS
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  - Defining the DB/DC Environment
  - Data Communications Packages
- THE ROLE OF DATA BASE ADMINISTRATION
  - The DBA
  - Diplomatic Skills
  - Technical Skills
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WANG

In 1975-1985 Period

Micro Era Predicted to Find Way Into Many Homes

BLUE BELL, Pa. – "The 1975-1985 period is expected to be the era of the microprocessor," and many of its applications will be in the home, according to Herman Lukoff, director of technical operations for Univac.

Microprocessors will be used to perform a variety of tasks such as controlling home heating systems, planning and helping cook meals, as well as providing information-retrieval systems that allow more people to work at home rather than in offices, technical personnel at Univac predicted.

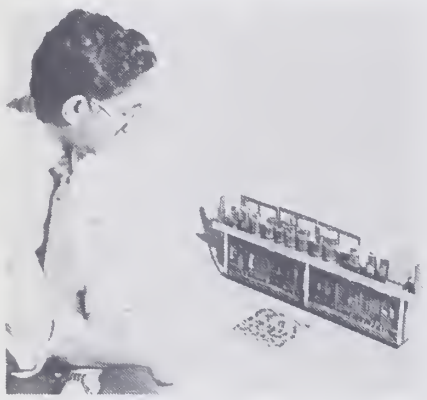
During the next 10 years, input and output devices will become much faster and more efficient, with computer output microfilm (COM) devices very prevalent, according to Dr. John Mauchly, co-inventor of Eniac, the first all-electronic digital computer.

Hand-Held Cartridges

Mauchly also predicted increasing use of battery-operated hand-held tape cartridges which can store information for later playback directly to a computer.

Dr. Joseph Mathias, director of research and advanced techniques at Univac, said powerful computers of the future will use larger and faster mass memories.

"Mass-storage devices capable of on-line access to a trillion bits of memory are now becoming available, and advances in technology will make much larger on-line storage economically feasible," he said.



Dr. Joseph Mathias points to tiny wafer like those used in microprocessor computers. Above it, from bottom, are a third-generation integrated circuit, a second-generation solid-state printed circuit card using discrete transistors and a vacuum tube array from the first-generation Univac I.

"Such a system could be used to store all the medical records of every person in the U.S. with instant access via communications links by any hospital in the U.S. or the world," Mathias said.

Home Microprocessors

"The home microprocessor should cost no more than a major appliance like a refrigerator," according to Dr. Val E. Herzfeld, vice-president of business planning and development.

"It would be small enough to fit in the drawer of a desk."

In a typical use, a microprocessor would control heat and air conditioning, taking wind velocity, humidity, temperature and other factors into account.

"Most major buildings and probably many homes, will install computerized control systems within the next 10 years," Lukoff said.

Monitors Temperatures

"Computers will monitor inside and outside temperatures, heat loads and electrical demands. They will constantly regulate boilers, fans and air conditioning for optimum operation according to need."

When one goes away on a trip, the home computer can be instructed to keep the house at different temperatures at various times of day, turn on lights at certain hours or even answer the phone with an automatic recording.

One would program a computer almost as simply as one sets today's thermostat, he said.

The same computer may also automatically control timing cycles of washers and dryers and the cooking periods for various meals. It could even assist in menu planning according to dietary content and cost based on seasonality.

Work at Home

Dr. Earl Joseph, staff scientist and technology forecaster, said "fourth-generation" microprocessors will allow many more people to work at their homes instead of at the office.

"I envisage a low-cost portable microprocessor system which could be connected to larger computers at company sites," Joseph said.

"People could send in their work over leased telephone lines and receive other assignments back.

"The same system would perform many functions. It could store printed news items from press services, for instance, and show" those desired on a CRT, Joseph said.

The micro could be programmed to call attention to all stories on a certain topic. "The same idea could be extended to magazines and even books – storing them in the computer for recall on demand. This would be equivalent to having a library at one's fingertips.

"Energy saved would be substantial considering commuting costs against telephone line charges," he added.

Home computers could also be programmed to keep financial records, including income tax information, and show when bills are due.

Micros will be a standard feature of all cars, controlling both carburetion and ignition, Joseph said.

Microprocessors require less power than previous computers, and are thus more feasible in the home.

The first generation of computers, including Eniac and Univac 1, used vacuum tubes. Univac I required about 90 kilowatts of power and made about 1,000 calculations per second.

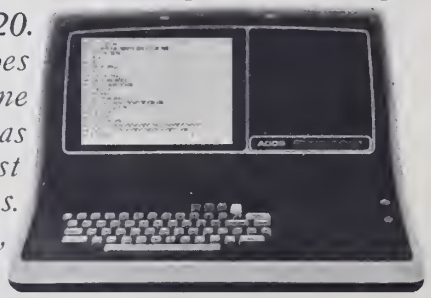
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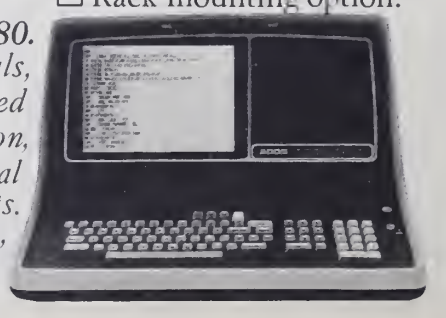
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Ensuring Competition Seen as Users' Responsibility

WASHINGTON, D.C. – The responsibility of ensuring a competitive DP marketplace rests on the shoulders of users, who should be asking for a bill of rights rather than more regulations, according to A.G.W. (Jack) Biddle, president of the Computer Industry Association (CIA).

By promoting multivendor environments in their DP shops, users will assure themselves of the future ability to configure flexible systems to meet their demands, Biddle told the American Institute of Industrial Engineers Conference on Federal ADP Procurement here recently.

"If you do not foster competition now, you will be writing the few large firms that exist a blank check to raise prices to oligopolistic levels. The so-called economies of scale will be used as a lever for excess profits, not lower prices," Biddle warned.

He outlined steps users should be taking to ensure the viability of those firms that do not belong to the group of large mainframers.

Users should begin by making a "simple distinction between functional units of a computer/communications network," he said.

"By defining what the logical units are, and I mean terminals as distinguished from their communications links, controlling elements vs. processing elements, storage devices, vs. their data channels, you can then demand that the elements that store the data and do the processing can be purchased competitively," he said.

Users should also demand that mainframers publish interface specifications sufficiently detailed to allow others to build devices to attach or work with the mainframes, he said.

Standard protocols are needed for communications. "You can demand that all security encryption devices and the standards by which they are implemented be made available to every supplier at the same time," he said.

He told attendees they should be supporting standards agencies "to the hilt by penalizing those suppliers who refuse to go along with standards. You should be demanding that all functional units, including operating systems and maintenance, be unbundled.

"You should require that all procurements allow for bids from many vendors just to assure yourself that you have sought the best possible system."

Users Must Take Control

Biddle told attendees they have "both the sophistication and the need to take more control" of their DP lives. "Taking advantage of a multivendor environment means recognizing those two simple facts.

"In return you will see increased efforts on the part of the independents to learn your rules. You will see them take more initiative to meet your needs," Biddle promised.

"It may be that a multivendor environment will never develop. I believe, however, that you will benefit greatly if you give such a world a chance," he added.

Explaining why there is a question whether there will be a multivendor environment in the future, Biddle sketched a scenario of mainframes and minicomputer makers locking horns.

To begin with, the computer industry is hardly a model of competition, with two firms controlling more than 80% of the installed value of general-purpose DP systems in use in the U.S., he said.

Big spenders like RCA, General Electric, Singer and Xerox find it "difficult if not impossible to be viable when the totality of the available market is less than 25% of the total market."

The mini industry, currently booming, in the long run depends on an end-user market for the minis that are sold to original equipment manufacturers, Biddle said.

But the mainframers are encroaching on this territory, as evidenced by Burroughs Corp.'s acquisition of Redactron and Honeywell's new line of minis, as well as the activity at IBM's General Systems Division, he said.

And, from another view, the minis "may be forced to invade the mainframers' markets because of the increased power of minicomputers, which are now powerful commercial computers in their own right as well as front ends to terminal systems."

"The link through the minis to the mainframes will be too great for the mainframe makers to leave to the minicomputer companies," he said.

"The question is whether the mini makers can continue to thrive in direct competition with companies up to 20 – and in some cases 1,000 – times their size."

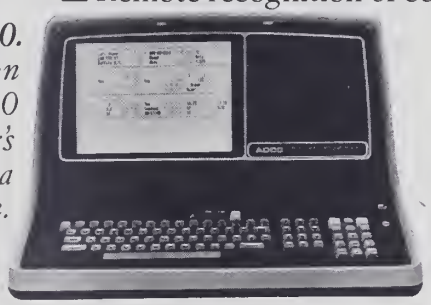
Biddle told the government DP specialists that "saving competition in the computer/communications industry is your problem as much as it is the problem of the manufacturers."

Government officials and other users need to be aware of anticompetitive practices in the computer industry and to not give support to those that exist, he said.

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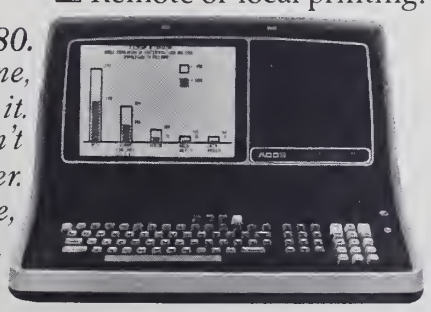
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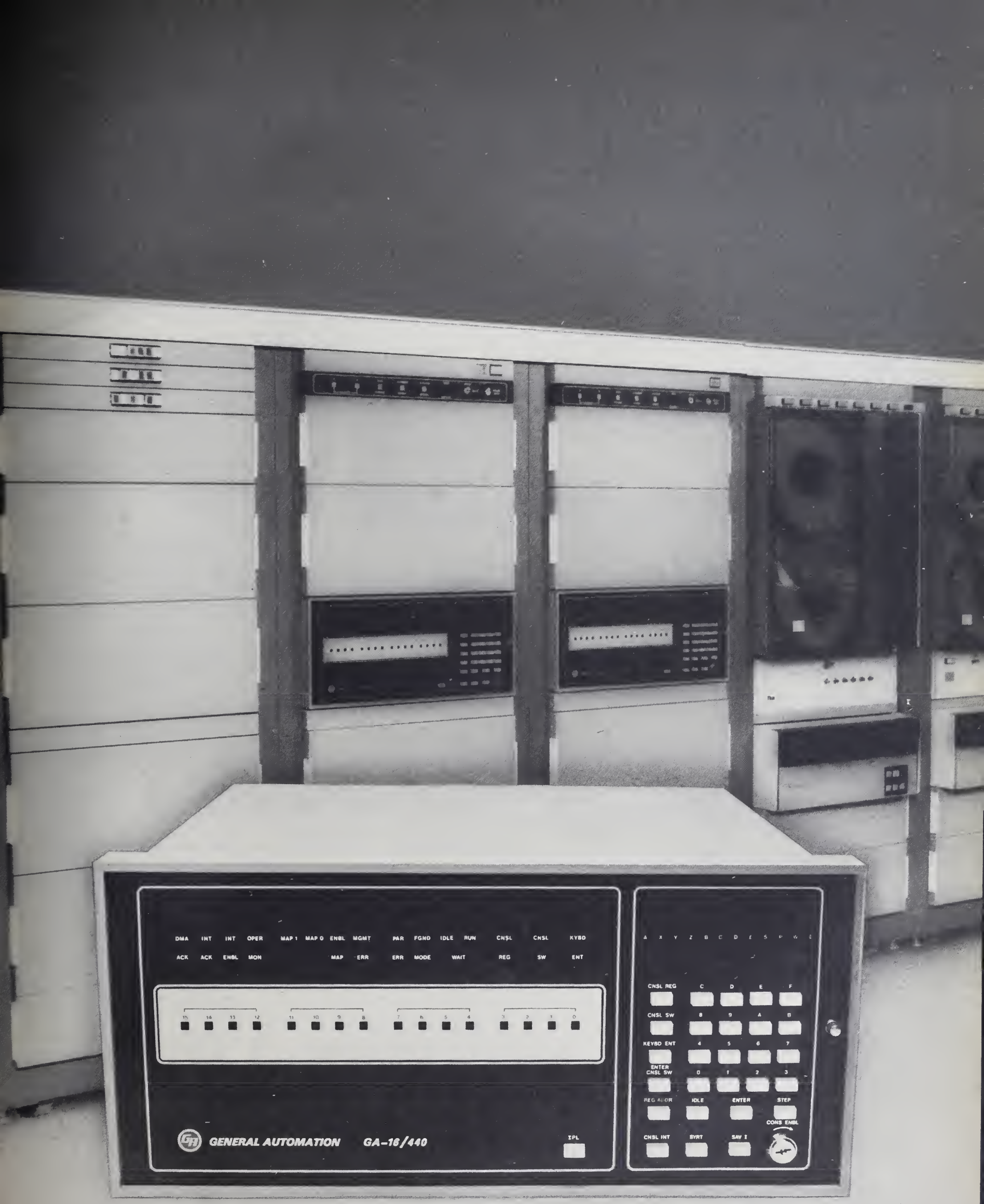
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Privacy Concerns Cited

County Makes Clerk Retrieve DP Birth Records

By John P. Hebert
Of the CW Staff

ROCKFORD, Ill. – A county clerk accused of transferring confidential county records to a private firm here last year said his action resulted from being "tired of getting garbage reports" from the county DP center.

The Winnebago County Board made the clerk retrieve the records after an assistant state's attorney said the privacy of some individuals could be violated.

Paul Gill, Winnebago county clerk, said he had wanted to update an "old-fashioned method" of referring to computer printouts of birth record information compiled by the County Health Department and updated each month.

The printouts were difficult to deal with in making additions and deletions to birth records and it was too costly to receive a new printout each month, he said.

Gill said he had initially gone to the county's DP department to inquire about the possibility of computerizing the indexing of birth records by putting the information on a CRT terminal in his office.

However, the manager of the county DP center told him it would take three months to write the programs and $15,000 to implement the system, Gill said.

Went to Serviee Bureau

Dissatisfaction with the cost of the proposed system led Gill to discuss the matter with Computer Services Corp. (CSC), a local service bureau, he said.

The manager of CSC, Vaughn Duck, was an "old friend" of Gill's and told him CSC could run a benchmark test of the proposed system free of charge, Gill said.

After discovering CSC could write the programs for the indexes in a few days and, if the system worked well, the county would be charged for machine time only, Gill gave CSC the go-ahead to install a CRT terminal in the clerk's office on a trial basis, he explained.

Duck was then deputized by Gill to maintain the confidentiality of the birth record information. The tape of birth record indexes were brought to CSC and copied, Gill said.

"In three days [CSC] had the system up and running" by installing an IBM CRT terminal and having the phone company hook up the unit so it could communicate with CSC's IBM 370 mainframe, he said.

However, shortly after the terminal had been installed, the county DP manager "went by the office, saw the terminal and went into shock," Gill said.

The DP manager notified the County Board "and the board gave me a hassle over it.

"I had to play their game and remove the terminal," which could make automatic corrections and was a "very easy and accurate system," Gill said.

The "game" was that the birth record indexes in CSC's possession were viewed by Assistant State's Attorney James Hess as illegal because they contained information which was confidential.

For example, in one case, Hess said, the records contained information detailing a father's name, a mother's name and the birth date and name of an infant which was different than the father's name.

"If the illegitimacy of the infant can be determined from the index, then the information is confidential," Hess said.

Since the County Board agreed with the attorney, Gill said, "I had to take the tapes back. I don't want to be stalemated in my own inefficiency."

Gill then questioned the improper use of confidential information by CSC as opposed to the county DP department.

"Just what safeguards do we have to prevent county employees from divulging the confidential information" as opposed to Duck, who was a deputized county clerk and couldn't divulge the information? he asked.

The county's DP center is "very unreliable," Gill claimed, adding it was too expensive to do business with it in terms of costs and in terms of the quality of information.

Meanwhile, the county clerk's office has returned to its "old-fashioned method" while waiting for the State Attorney General's opinion on the matter, which Gill said he requested.

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IBM GSD Gets Award For Energy Savings

SAN JOSE, Calif. – IBM's General Products Division here has been awarded an "excellent" citation from the Federal Energy Administration (FEA) for using over 35% less energy in 1975 than in 1972-73.

The key item of equipment in the plant's energy-saving program is an IBM 7, the company said. The computer serves as a power management system and its major function is to shut off 105 main air-conditioning fans at scheduled intervals.

Shutoff is standard procedure for nights and weekends, but the power load of a preset number of fans is also "shed" during peak use by computer-related sensing when it reaches a prearranged level, IBM said.

Sensing triggers shutoff for a predetermined interval which can vary from one minute to one-half hour.

The 7 also monitors weather variables like wind direction. Future plans call for optimizing fan operation according to outside temperature.

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In total, IBM saved over 30 million kilowatt hours of electricity in 1975 and 120 million cubic feet of gas, the company said.

Next ICCP Goal Seen Promoting CDP

By Catherine Arnst
Of the CW Staff

WASHINGTON, D.C. — The Institute for the Certification of Computer Professionals (ICCP) has directed its energies toward developing a good, stable administration since it was incorporated in 1973, John K. Swearingen, the institute's first president, said.

Now that the major administrative problems have been solved, ICCP is ready to move toward making the Certificate in Data Processing (CDP), which it administers, a recognized measuring tool, both within the industry and with employers, he continued.

When ICCP was first formed by its eight constituent societies, its stated purpose was "dedicated to improvement of standards, development of testing and evaluation for members of the computer industry and the promotion of standards of good practice" [CW, Oct. 31, 1973].

"There's a lot more to be done before these goals are reached," Swearingen said. He feels the CDP lacks recognition as a standard.

ICCP's largest concentration of effort in the next few years now will be to promote the certificate, particularly with employers, he said.

"The CDP should be promoted directly to employers rather than through traditional DP internal channels," Swearingen said.

At ICCP's January meeting, a small contract was authorized with an advertising agency to explore methods of advertising to employers, he said.

"The value of the CDP currently varies by employer; some companies provide incentives for taking the exam while others require that it be included on a resume.

"But this group is very small," Swearingen said. "It is not a universally valid assumption that having a CDP would help someone get a job," he said.

Applications for the CDP exam rose by 17% this year, however, with a 30% increase in new applicants, which indicates that promotion within the industry has spurred interest in the certificate, Swearingen said.

Licensing Issue

The licensing issue also brought attention to the CDP, he said. Whenever licensing of DP personnel is discussed, certification is discussed along with it, he said.

He questioned whether the CDP would prevent licensing by the government, however. "If licensing comes it will be because of public demand," he said. But "a CDP might be considered by the public as satisfying that demand."

DP personnel are not professionals in the same sense as lawyers and doctors, who offer services directly to the public; the majority of people in DP work for their employers – not directly with the public, he said.

The professional level in DP has to do with job responsibilities, and persons in higher level positions should truly be held accountable for their actions, he said.

Proponents of developing a set of standards for information processing similar to those put out by the British Computer Society have suggested that such a code should come under the auspices of ICCP, since it is an umbrella group.

Although ICCP did publish a code of ethics last year, "I don't see ICCP as setting standards for products, since we are dealing with people," Swearingen said.

The ICCP should revoke the CDP if there is reasonable cause, but "the ICCP is primarily a testing institution, and it should stay at doing that," he said.

"I think the responsibility of ICCP lies with issuing the CDP," Swearingen added.

The CDP exam does not include the entire range of DP activities at present, he said. "It covers only the business DP environment, but ICCP is "currently working on how to broaden the offerings," he said.

ICCP's recent agreement with the Psychological Corp. for assistance in drawing up the CDP exam [CW, Dec. 10]

Societies/ User Groups

is a major step in that direction, Swearingen said. The Psychological Corp. will provide psychometric consultation and services aimed at expansion of ICCP's programs to provide broader certification test coverage.

"I don't see much change in the CDP exam itself," Swearingen said.

Instead, "we might have a CDP in different areas, such as a CDP in business, CDP in engineering, etc.," he predicted.

We must have continuous change along with technology," with the exam being updated every few years, he added.

The ICCP board is currently studying various proposals to improve the CDP, including one which would encompass a series of exams testing skill levels.

Another avenue of testing being examined by ICCP's board is the reinstatement of the Registered Business Program (RBP), which was suspended by the Data Processing Management Association in 1974 [CW, Dec. 5, 1973].

The RBP is basically for programmers and would test people who do just programming, probably in Cobol, he said. There is also a possibility that there could be a similar test given in each computer language, he added.

Fred Harris, Swearingen's successor to the presidency of ICCP, "will get a lot of things straightened out at ICCP during his term," the outgoing executive said.

"In a memo to the board, I said I thought Fred Harris is going to have some exciting things to announce during his term, and I don't begrudge him it," he said.



John K. Swearingen

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Editorial

Another Inquiry Needed

Just five years ago, the Federal Communications Commission (FCC) ended a massive inquiry into the interrelationships between communications and computers.

The study, which took over three years and elicited thousands of pages of testimony from computer manufacturers and communications suppliers, resulted in a decision that called for the regulation of message- and circuit-switching services, but not data processing services.

It also called for regulation of communications services which had incidental DP components, but not DP services that had incidental communications.

The decision seemed well thought out and fair to all parties involved.

Unfortunately, the pace of technology and innovation has made that decision obsolete in less than half a decade – and the regulations promise to become even more out of date as the onrush of technology continues in the coming years.

Today there are "closet common carriers" such as Tymshare, which seem to offer services that include as much communication as data processing but are not regulated, while organizations such as Telenet, which might be able to make the same claims, are regulated.

AT&T has developed the Dataspeed 40 and the Transaction Telephone, which it claims are just improvements of its previous telephone and teletypewriter offerings, but which seem to compete with data processing terminals and which seem to be more data processing devices than communications units.

Both the Tymshare-type services and the AT&T terminal offerings fall in a gray area under the 1971 ruling. Arguments can be made both for and against regulation of such services under that ruling. There can be honest differences of opinions about how they should be treated.

Therefore it is time for a new, full-scale inquiry into the issues raised by the interrelationship of computer and communications.

This should not be a staff study undertaken by FCC experts alone, although the commission needs to devote considerable manpower and other resources to the effort.

Too often in governmental studies of this type, the voice of the user is the only one missing. The communications and computer vendors can – and do – spend considerable resources to make their own parochial views known. Users cannot often make this expenditure.

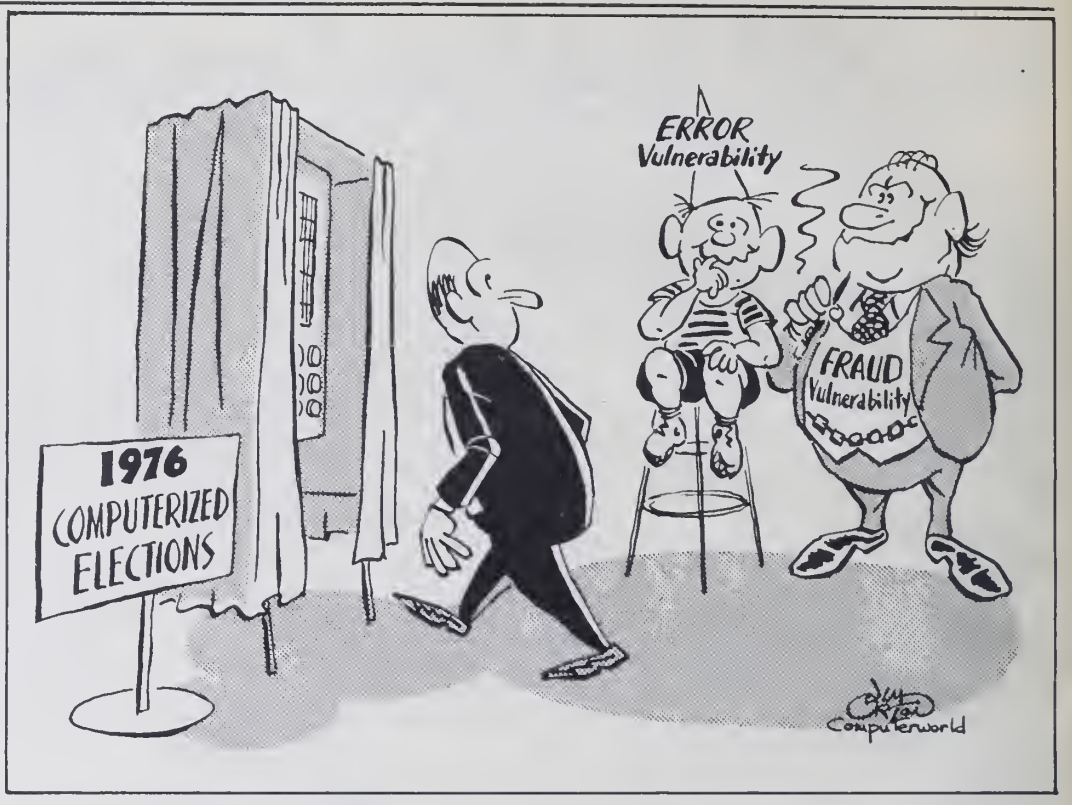
Yet the results of such studies have the greatest effect on users: They can determine what type of services will and will not be available and what those services will cost.

All organizations that claim to represent users – whether the Data Processing Management Association, the Association for Computing Machinery, the American Federation of Information Processing Societies, individual manufacturers' user groups, or the new Association of Data Communications Users – should take an active role in such an inquiry.

They should start acting now, not wait until it is too late.

The issue is too important to lie dormant. The commission should immediately reopen its inquiry.

And the issue is too important to be left to the vendors. The voice of the user must be presented, because the users of computers and communications will ultimately pay the freight for whatever decision comes out of such an inquiry.



Letters to the Editor

Detente Would Ease Tension Between Government and IBM

It has become clear from accounts of the ongoing proceedings that IBM has a legal staff which is considerably larger than that of the U.S. and other world powers. That fact alone, however, does not fully explain the government's slow pace in its march toward what is widely felt to be the obvious conclusion.

No. The real reason for the delay is that IBM also has superior armed forces. Its navy and air force, particularly, are awesome. And with the recent ending of selective service, the gap between its ground forces and those of the U.S., already significant, will increase for reasons first set forth by Charles Darwin.

It is hoped in Washington that, by moving slowly, some sort of detente can be worked out between IBM and the U.S. through which the latter can ultimately reduce its military outlays, with the assurance that IBM would react in a "good way" during any future problems with other nations or large companies.

Money thus diverted from the Department of Defense would be available for the continuing study of IBM software. This will become increasingly important when the new "structured" software hits the street.

Alonzo G. Grace

Glastonbury, Conn.

Free Enterprise Still Works

In response to David R. Hick's letter in the March 1 issue of *Computerworld*, sales representatives are generally given a specific assignment, which is to sell a given product in a designated territory at a stated price. The success of any salesman is in his ability to meet these goals.

The question of morals and business ethics within IBM is closely scrutinized especially in this day of "instant lawsuits."

We independents have learned how to run faster and harder in order to prosper in this highly competitive environment. This activity has given the user "more bang for his buck" and has given rise to an industry growth rate which is unprecedented in terms of both product and application development.

There are no free lunches. Anyone capable and willing to apply himself in a positive manner can still attain his goals in our free enterprise system.

James E. Sigler

Torrance, Calif.

CW Not Fulfilling Its Role

As a newspaper for the computer industry, *Computerworld* failed in two ways to fulfill that role when it printed in the Jan. 12 issue, "Accounting System Increases Cash Flow by $500,000."

First, the information was not really news anymore. This story, with a different name for the application package, was first sold at least 10 years ago. What this hospital did has been done at least 1,000 times since then.

Second, it was an indirect advertisement for the vendor's application system. Since the vendor involved has ample resources to spread the word about its products, it hardly needed this kind of help.

CW has an obligation to its subscribers to apply some judgment and knowledge of the computer industry in selecting articles for print. Certainly, one criterion should be whether it is new and timely.

A.L. Moore

Often users save by applying old ideas to new situations, and that's news. CW is not devoted exclusively to the latest and newest, but rather to how to get the best service for the least money, even if that involves using older techniques sometimes. Ed.

Data Past

Five Years Ago
March 17, 1971

Both IBM and Xerox Data Systems (XDS) introduced mainframes recently – the communications-oriented IBM 370/135 and the XDS Sigma 8. The 370/135 had an increase in performance from its solid-state memory and a price lower than the 360/40. The Sigma 8 had approximately double the power of the Sigma 5 and from 16K to 128K of core memory.

– – –

LOS ANGELES – Strong opposition by computer users to a proposal to meter local telephone calls forced postponement of the issue before the California Public Utilities Commission (PUC). More than 20 user complaints were sent to the PUC in response to a commission report blaming the computer access lines for overloaded telephone conditions.

Eight Years Ago
March 20, 1968

WHITE PLAINS, N.Y. – Reacting to competition mainly from NCR and Honeywell, IBM came out with a 30% cheaper version of the 360/20. The IBM move placed the 360/20 in direct competition with the NCR Century 100, the Honeywell 110 and other versions of third-generation hardware.

– – –

MIAMI – Milgo Electronic Corp. introduced a "hot line" device, the Model 10 voice adapter, which piggybacked voice communication simultaneously with 2,400 bit/sec data over a single unconditioned telephone line.

Oh, What a Tangled Web.....

. . . . . we weave, when first we practice data stream encipherment! And, as always in our nutty trade, the most tangled web of all is political, human, supratechnical.

A little later in the same poem, Scott apostrophizes Ruth Davis: "O Woman! in our hours of ease, / Uncertain, coy, and hard to please" – that's *got* to be Ruth, although I'm still waiting for the "ministering angel" phase! And in this matter of security, Dr. Davis and her Bureau of Standards trainbearers are playing a central but mysterious role.

Goes back quite a way, it does, to early efforts within the Federal establishment to tap the classified expertise available at places like the National Secuirty Agency. I didn't do much when I was director of the NBS crew, although reasonably *persona grata* at Fort Meade, but when Ruth succeeded me her excellent connections in the intelligence community made NSA assistance quite practical. Out of this, quite recently, came a proposed encryption algorithm for general (i.e., noncryptological) application inside the government computer-user community.

A lot of military/diplomatic cipher systems involved classified hardware, mechanical or electromechanical. Our stuff has to run on regular computers; *all* the security, therefore, depends on the degree of encipherment: fancy methodology and/or long keys. But again, it's impossible to keep the software system inviolate. So in the end the whole business comes down to the key. Given a random key as long as the message itself, and discarded after each use, perfect security is guaranteed – but almost impossibly expensive. Given a short, mnemonically attactive key, NSA types or vigorous amateurs can invade the data bank with a hand-held calculator.

Now comes the funny part: the Commerce recommendation, incorporating NBS and NSA know-how, is for a key just short enough to be breakable with the very fanciest current general purpose machines. Not in seconds or minutes, of course, but within possible economics. This is all to be ELSI (extremely large-scale integrated circuits); the encryption and decryption devices will be IBM single-chip, competitor few-chip, in the 1976-82 generation. Cheap regardless of key size, even assuming square-law complexity; that is, doubling the key length might require a four-times-as-complex superchip, which might cost $50 in very large quantities instead of $25: chickenfeed – the price of a Big Mac by 1982!

Datamation, our handsome *confrere*/competitor, has been doing interviews about this, and is quite suspicious of the whole recommendation. Not as paranoid about the Grim Giant as I, they nevertheless are aware of the possibility of reduction of competition by IBM's technical sophistication in the security area – something I've been warning about in my speeches for two years.

Is NBS (which is a lot less wary of IBM than in my day) or NSA (somewhat of an IBM stronghold; they were SHARE founders in the mid-Fifties) recommending a key length short enough for IBM technicians to clobber, but too long for plug-compatible peripheral suppliers to master? That would be a fairly narrow band, but otherwise, why not just opt for 72 bits, or even 128, and forget the whole thing? Curious!

Davis says standards are not supposed to lead, but to conform to current practice. That's not so, for ADP; even the Standards Institute gave the X3 people long rein, to get out *ahead* of consensus in OCR and data transmission and the whole gaggle of interaction areas. The Brooks Bill recognized this back in the Sixties, and brought fancier people at the Bureau of Standards into the federal picture alongside GSA because the screw-thread-standards kind of thinking was inadequate. And Ruth knows this, and refers to it proudly in other contexts.

This really ought to go back for another pass. How about the Government Operations boys on the Hill taking a look? The House side, with Jack Brooks a very experienced and pretty cynical hand in the area, could poke at the NBS/NSA link a little, and the NBS/IBM interactions – if any – quite vigorously. Would encryption technology give IBM back some of its lost Washington ADP business? I think it might, and I think Congressman Brooks would be interested. Commerce could hold off, and even if Dr. Davis pushes ahead, word of Congressional hearings next Fall would delay too rapid adoption of the "short" key. In industry, I mean: even in IBM, unless it already has a compatible package under way for announcement before the National Computer Conference.

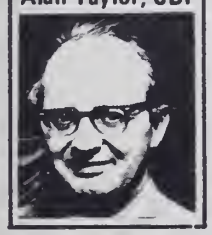
Who would have thought, when the first hints of what NSA did behind all that electrical fence began to leak out, in the Fifties, that a couple of decades later insurance companies and federal and state data bankers, and Wall Street and law firms and credit bureaus, would be arguing cryptographic security and reading "The Codebreakers"? Remarkable!



Herb Grosch

'Personalized' Mailing Foul-Ups No Laughing Matter

The Taylor Report
By
Alan Taylor, CDP



The word "address" has two meanings: where a person is to be found and how he should properly be spoken to. Computer addressing has often been attacked for its inability to notice when it sends the same message many times to a single individual.

A different annoyance that stems from careless thinking through of what computer records are and are not comes from the failure of many addressing systems to get even quite common names correct.

It doesn't mean the people who set up the systems are not knowledgeable. For instance, the Institute for the Certification of Computer Professionals has addressed candidates and issued certificates for admission to its examinations as "Mr. III."

Nor does it mean the people are inexperienced, for American Express once sent an invitation to enjoy "the increased mobility" available to a possessor of one of its credit cards to a second-floor facility of AT&T, addressing it "Dear Mr. Floor."

These computer outputs are often a butt for jokes. Few people track down where they came from. One person who did, after being addressed by his own credit card company as "Dear Mr. Programmer," found the name had come from a trade magazine subscription which wanted his title to be put in the field immediately after the name field.

Apparently the fields were not confused in data entry, or the original magazine labels would have been incorrect, which they were not.

Perhaps the worst case of good knowledgeable computer sophistication and brilliant carelessness about the accuracy of the result that I have seen is illustrated in the figure.

The letter shown arrived at the Platteville Computer Center of the University of Wisconsin accompanied by a Lifetime Half Cover Price Double Guarantee recently, addressed to "Mrs. Univ O Wisconsin."

Known or Not

Where could *Newsweek* have gotten hold of an address that defined the University of Wisconsin as being both female and married?

True, there may be an assumption that subscribers to *American Girl* are female, or that those who buy *Highlights* are parents of school children.

But even here these descriptions will simply be assumptions and certainly will not be based upon married/unmarried questions.

Newsweek and others in the mailing game discovered long ago that the more the computers seems to know about a person and the more it repeats it (there are five Wisconsin references, four "Mrs." references, two Platteville references and one indirect [family] reference, giving a total of 12 mindless, programmed references in the 30 lines of the *Newsweek* letter, the greater the effect will be.

Asking the Impossible?

In asking for computer output accuracy, are we asking the impossible? Or is there some way in which this annoying dissection of an address could have raised a question about whether the letter should have been sent out at all?

Certainly there are technical ways. The use of abbreviations for "Senior," "Junior" etc. are caught with a search. The problem of sending "personalized" mail to institutions appears to call for searches for the standard names of institutions, or else to call into question the use of personalized mailings from impersonalized source listings.

Are there any better ways? Or are there any stronger reasons than have so far surfaced to bother about the matter at all?

I feel certain there are both stronger reasons and better methods for preventing these types of problems. If you know of any, I would be pleased to hear of them.

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You can be certain, Mrs. Wisconsin...
...That this letter is not popping up
IN EVERYONE'S MAIL in Platteville.

Dear Mrs. Wisconsin:

Should you decide not to accept this unique invitation, please **do not** pass it along to anyone else. We would rather that you simply throw it away.

You see, I am writing this letter **only** to a carefully selected audience. The list upon which I found **your** name would indicate that you are an involved and informed individual. That's why I want to invite you to join our family of readers with this unparalleled **lifetime half-price offer:** to read Newsweek for the rest of your life and **never pay more than half the cover price!**

Although I'm sure, **Mrs. Wisconsin,** you are already acquainted with **Newsweek,** you may not know how much **surprising news** it brings you each and every week. For example, I'll bet you'd be startled to learn about the highly visible Americans who are turning to **crime** at an unprecedented rate. Or about the possibility that nature provides its own completely safe **sleeping pill.**

Mrs. Wisconsin, I'll also wager that you didn't know **30,000** Americans will lose their lives this year -- not in combat overseas, not on the nation's highways -- but in everyday activities in and around places like **Platteville.**

You didn't know? With **Newsweek,** the **Wisconsin family** would. Just read a little further for a few **choice words** from Newsweek about...

Those "new" criminals ... In just 15 years, the number of these Americans arrested for violent crime has

The above page from a magazine solicitation sent to the University of Wisconsin Computer Center recently illustrates what happens when a computer "personalizing" program is used with an institutional address.

'Bubbles' Finds Government Money Both Boon, Bane

By Joseph T. Rigo
Special to Computerworld

My friend, Bubbles McGuire, dropped by last night, lugging a sack of money.

He was on his way home to Cambridge after a week in Washington. He needed a few hours to unwind.

I took his coat and handed him a bourbon and water. He gave me a $100 bill from the sack.

"Government people are absolutely great at giving away money," he said. "I tell them so. It makes them feel so good to know they do at least one thing well. They give me an extra 20% every time."

Bubbles is a big man in computer science research. He started out in the late 1950s as an instructor at a small college in Maine. He taught students about Charles Babbage and showed them how to wire plug boards.

It was really all he could do. The school was miles from a real computer, and *Computerworld* hadn't been invented yet.

"It was like the art department," he explained. "They show the same slides of Mona Lisa year after year, and no one ever complains."

Time caught up with Bubbles. His students couldn't get jobs anymore. He faced the fact that he was going to have to learn something about computers.

"IBM had been trying to dump an old 1620 on us for years," he said, "but the school couldn't afford to run it. Then I applied for a small Navy research grant to study computer memory.

"To my surprise, we got it. We were able to take the IBM machine and, all of a sudden, we had the start of an honest computer science department."

From there it was onward and upward, with one grant after another.

Bubbles' big breakthrough came five years ago. It was a research project that won him international fame – and his nickname.

His paper was called "Effects of Heat from the Wait Lamp on Evaporation of Magnetic Bubbles."

He did not actually prove there was any loss of accuracy in bubble memory, but he attracted scores of new graduate students, faculty and grants to the school. A Computer Science Hall was constructed.

Then the trouble started.

"The problem with research," he explained, "is that everyone has to write up his findings. And one condition of the grant is that the paper has to be published someplace, with credit to whoever put up the money."

So Bubbles organized the New England Chapter of the American Association for the Advancement of Scientific Research Grants.

"Would you believe that we published 250 papers in our journals in one year? We got rid of another 300 in regional and national conferences, and we still fell behind production.

"And we were only one outfit. ACM, IEEE, Afips and all the others had their presses running. Between us, we started six new journals in one year, and it wasn't enough."

Bubbles sighed.

"It got so I was going blind checking footnotes. So I got out."

Bubbles organized his own company. It conducts research and publishes scientific textbooks. On the side, it produces a line of computer memory humidifiers to keep magnetic bubbles fresh.

"My business is still with the government," he said, "but it's a rough game down there now. The National Grants Foundation is in the act, and it wants a larger share of the market.

"I got a nice chunk from the Navy last month, so this time I had to take an equal amount from the civilians. I don't know what I'm going to do with it. I've already got half the people in town studying bubbles, and the other half are typing research papers for them.

"How are the humidifiers going?" I asked.

"Couldn't be better," he answered. "It turns out they're good for eavesdropping on telephone lines that are supposed to be tap-proof. I just helped the CIA install a couple in a van parked outside FBI headquarters. They may order another dozen."

Bubbles shrugged. It was getting late. He picked up his money sack and headed for the door.

I handed him his coat. He gave me another $100 bill and headed off into the night.

Reader Commentary

COM Recorders' Put-Down Shows Need to Bone Up on Capabilities

By Dannie R. Miller
Special to Computerworld

While I am sure William B. Simmons is very competent, I must take exception to many of the points mentioned in his article, "COM Often Not Compatible With Report Generators" [CW, Feb. 9].

Simmons first made the point that many DP shops may find themselves devoting considerably more programmer hours to coding output reports for computer output microfilm (COM) than they did with hard-copy printers because COM software "is often not compatible with the problem-oriented report generator packages many DP shops use today."

In over 15 years of working as a DP and microfilm consultant both in this country and Europe, I have found "problem-oriented report generator packages" rarely used except on extremely small machines, such as the IBM 3 or 360/20. Most large DP shops find the report writer functions so limiting they would rather spend the extra hours to code output formats.

In the few cases where I found people using report generators and not wishing to rewrite their programs, the output was merely assigned to a tape or disk drive and then "second passed." Admittedly it does take additional time to second pass the print tape through a COM formatting driver, but it is still considerably faster than printing.

Problem With Words

I would also take exception to the words "dumb" and "smart." According to *Webster's Seventh New Collegiate Dictionary*, "dumb" as a primary meaning of the inability of speech, with stupid and foolish being at the very bottom of the list as definitions.

"Smart" has a meaning either related to pain or to that of bright, witting, clever, pert, saucy, neat, trim or stylish. In that, Simmons was quite correct – I have never known a COM recorder to utter any speech, nor have I known a COM recorder to be witty, clever, pert, saucy, neat, trim or stylish.

A COM recorder without any kind of minicomputer front end does require that most of the commands be sent to it from the magnetic tape on the tape drive. However, many recorders now being built do have mini front ends.

This type of COM recorder can accept just about every tape format ever produced by a computer: fixed unblocked, fixed blocked, variable unblocked, variable blocked and undefined. It can read 4 by 3 9-track tapes, 7-track BCD, 7-track Ascii, 9-track Ascii, 9-track Ebcdic and, again, just about any format that has been produced to date.

Simmons' statement that report formatting packages "all seem to be geared to producing 'ordinary' fixed-length, blocked records and incorporate their own I/O logic" was completely misleading. To the best of my knowledge, all software formatting packages in use today running on 360/370 equipment use IOCS as provided by IBM.

When Simmons said "there may well be situations in which the balance of economic factors is in favor of 'dumb' units," I found it hard to believe he has considered the continuing rising cost of paper today. A few minutes of programmer time spent today can more than well be justified over the succeeding months by the cost savings in paper and processor time.

None in Existenee

Finally, I would like to draw attention to Simmons' last point that a COM unit needs to escape all the above difficulties in that it should "be able to select and print, on multiple passes, reports that have been formatted in parallel onto the same tape."

I don't believe that there is a report writer now in existence that allows one to interleave, in the same output stream, lines from multiple reports. If there is, then each of these lines would have to be keyed to a report number in some fashion.

If the records are thusly keyed, many of the non-front-ended COM recorders and all of the front-ended COM recorders can differentiate among the various print lines and, therefore, print multiple pass reports from the same print tape. I do believe that most spooling systems would find this a somewhat unusual task.

I would suggest that before one puts down COM recorders, one should bone up on their capabilities.

Miller is with U.S. Datacorp in Portland, Ore.

Letters to the Editor

What Really Counts

We have read much over the past few years on the licensing of the DP "professionals."

I would much rather deal with an individual who is honest, competent, has "down in the pits" experience and realizes his own capabilities than someone who points to a certificate. I feel we are a little too eager at times to buy someone's credentials on paper.

Sometimes we tend to congratulate the people who have the lesser amount of failures – maybe because these people do the lesser amount of work.

Anthony A. Schroeffel
Gaylord, Mich.

AT LAST! A Comprehensive Microprocessor/Microcomputer Report . . .

The publishers of Computer Design Magazine and the market research department of International Data Corporation wish to announce an important coauthored report. The SURVEY OF MICROPROCESSOR/MICROCOMPUTER BUYERS examines the dynamically expanding microprocessor/microcomputer market. The report is the result of a study conducted with 6,000 qualified microprocessor/microcomputer users and potential users across the country.

This study will be an important marketing aid and required reading for every manufacturer of: Microprocessors, Microprocessor-Related Devices, Microcomputers, Minicomputers, Computer Peripherals, Digital Systems and Subsystems, and Test Equipment.

The report is also aimed at informing end-users of microprocessors/microcomputers of just how their company measures up to other companies who are currently into micro-related products.

A Few of the Major Topics Covered

- Type of equipment using micros, and peripherals chosen.
- Models of micros & memories used and criteria for selection.
- Various aspects of software and problems encountered.
- Opinions and recommendations for the current market.
- Future plans.

For more information on this 200-page report, containing data from the largest answered survey yet devised in the micro area, please cut out and send the order/inquiry card to: John Breyer, IDC, P.O. Box 915, Waltham, MA 02154.

Gentlemen: ☐ Please enter my order for your Survey of Microprocessor/ Microcomputers Buyers – $395. ☐ Check enclosed. ☐ Please send me more information concerning the study. ☐ Please bill me.

Name _____ Title _____
Company _____ Department _____
Address _____ City/State/Zip _____



There are times when there's too much at stake for mistakes.

That's how it is running high-density drives, too.

With today's high-density equipment, you need to know what you're up against when using marginal computer tape.

For one thing, you're up against a potential for write/skips that can eat up available tape space fast. That, plus the loss of valuable data and resulting re-creation costs, can make a bargain tape get expensive fast. Then there are the things that are occurring but being masked by the GCR format. Ask your Graham product technology man about that.

If you're developing a smaller library, now you can afford a better library, too.

To get a better cost/results ratio, get Epoch 4.



GRAHAM MAGNETICS
Graham, Texas 76046

• **With Overviews and Details** • **Members Sought**

'DBMS' to Run Seminars, Publish Newsletter, Guide

By Don Leavitt
Of the CW Staff

NEWTON, Mass. – The Data Base Management Society ("DBMS") has been organized, according to founder John Cooper, "to encourage the use and development of comprehensive data base management systems (DBMS)."

With such a charter, this organization is following the trend set by others, such as the Association of Time Sharing Users [CW, Sept. 17] and the computer Measurement Group [CW, Oct. 22], to provide users with insight into general areas of the software and services industry, without keying on just one vendor.

The society will sponsor a series of nine seminars starting in May and a national Data Base Forum in September. The society will also publish a monthly newsletter, a quarterly journal and an annual *Guide to Data Base Management Systems*.

In addition, "DBMS" will sponsor special data base management conferences specifically directed toward different types of users, environments and systems, Cooper said.

The spring seminar series is scheduled to start on May 5-7, in New York City and follow weekly in Los Angeles, Chicago, Atlanta, Washington, D.C., Houston, Boston, San Francisco and Toronto.

Speaking at the seminars will be local users of most major DBMS plus local vendor technical and marketing personnel. Also participating in many cities will be local and national consultants, he said.

The seminar fee for society members will be $170 per individual. The fee for nonmembers will be $195.

Sessions at the three-day National Forum, scheduled for next September in Chicago, will focus on the various environments in which a DBMS can be used, as well as on the specifics of the systems themselves.

Special sessions will consider those situations in which the business of the user might affect how the DBMS is implemented, Cooper added.

Presentations will be made by DBMS vendors on their current offerings and future plans. There will also be presentations by vendors of associated software products about the use of their systems in a DBMS environment.

In addition, a session will be held to discuss the future role of "DBMS" and its members. The fee for attending the forum, which will include a lunch daily plus a dinner on the second night, will be $150 for members and $175 for nonmembers.

The society's newsletter will feature articles and reports on data base forums, conferences, seminars and user meetings which may be of interest to members. Also featured will be articles on new systems and features which impact the data base community, Cooper said.

New users and members will be announced and changes in member organizations will also be noted. The newsletter will also provide a place for member organizations to announce any opportunities which may exist for individuals in the data base field.

Members will be invited to "speak out, gripe, or sing praise in the Readers Comments section," Cooper said.

The newsletter will be sent to all individual members and to the prime contact at member companies.

The first issue of the society's *Quarterly DBMS Journal* will be published in July, Cooper said.

There will be 10 to 15 articles per issue and each issue will be 50- to 75 pages in length. The subscription fee for the journal will be $25 for members and $35 for nonmembers.

In September the society will publish its first annual *Guide to Data Base Management Systems* featuring a management overview and in-depth technical review of each major DBMS, Cooper said.

It will also feature reports by individual users of each system and a poll of user satisfaction. The guide will cost $75 per copy for members and $95 for nonmembers.

The society will also sponsor special two-day conferences directed toward special areas of usage. Conferences have been tentatively scheduled in September, for example, for minicomputer usage of DBMS and in March for DBMS use in government, hospitals, education and banking. The conference fee for members will be $120 and $145 for nonmembers.

The society is open to any individual or company. Dues for two-year charter memberships, open through April, are $25 for individuals and $200 for companies.

Company membership entitles all members of that company to society benefits, Cooper noted.

After the charter period closes, the dues will cover only annual memberships, he added.

"DBMS" is at 101 Ruane Road, Newton, Mass. 02165.

PDP-11 'Total' Has Multitask Version

CINCINNATI – The potential for business-oriented data processing on Digital Equipment Corp. PDP-11s has increased with the introduction of a PDP-11-based version of the Total data base management system (DBMS) from Cincom Systems, Inc.

The software is available in both single-task and multi-task editions. The capabilities of the repackaging for the DEC gear are directly comparable to those of the data base systems available for larger systems for some time, Cincom said.

In common with other DBMS users, PDP-11 installations with Total will be able to organize data logically utilizing network or hierarchical relationships, rather than with the conventional file structures normally imposed on DP sites, the vendor said.

Total separates the user from concern about the physical placement of data, Cincom said, and existing application programs are not affected by changes in the data base itself.

This data independence extends right down to the data field level, the company claimed.

The software also eliminates or at least "significantly reduces" data redundancy, file reorganization runs, data management maintenance programming and program recompilations, a spokesman added.

Cutting back on duplication of data also cuts back on the danger of updating one instance of a field, for example, while leaving an old value in another location, he explained.

Total includes a data manipulation language with both command and control functions which can be accessed with Macro-11 assembler and Fortran programs now.

Support for Total under Cobol on the PDP-11 depends on DEC's release of a Cobol compiler, Cincom noted.

Total is currently available for the PDP11/40, 11/45, 11/55 and 11/70 models operating under DEC's RSX-11D and IAS environments. The single-task version is also available under RSX-11M.

The DBMS' single-task version is available for a one-time charge of $13,500 or leases for $450/mo. The multitasking version costs $16,500 or $550/mo.

Cincom is at 2300 Montana Ave., Cincinnati, Ohio 45211.

CPU Time Cut in Adabas 3.2.0 Tests

RESTON, Va. – Reductions of almost 50% in the CPU time required for data operations may result from the use of an enhanced version of the Adaptable Data Base (Adabas) system in IBM OS installations, according to its vendor, Software AG of North America, Inc.

Efficiencies within Version 3.2.0 are achieved by a new algorithm for data compression/decompression, a spokesman said, and by maintenance of internal information for many users in a multiuser environment.

The claims are supported by a benchmark run at Washington State University, according to Clay Burrows of that school.

"Very simple" programs run on a 360/65 under OS/MVT worked at retrieving varied numbers of fields from 10,000 records. When all 59 fields were retrieved from each record, Version 3.1.4 took 359.25 sec of CPU time, while Version 3.2.0 did the same job in 187.38 sec, Burrows said.

When fewer fields were retrieved, the improvement dropped, but was still better than 20% in all situations except when only the first field in each record was being sought. Then the enhanced version took slightly more time than the old, Burrows said.

In addition to generally cutting CPU time, this version of Adabas provides for the creation of a descriptor or key field from part of an existing field, without affecting the data records themselves.

A number of additional enhancements simplify the process of calling Adabas from an application program, the vendor noted, without providing details on these changes.

At the same time, Software AG also said an interface between Adabas and Datamanager, a data dictionary system developed by London-based Management Systems & Programming (MSP) [CW, June 11], is now available from MSP.

Adabas is available for a one-time license fee of $120,000. Month-long on-site demonstrations geared to the user's applications can be arranged, Software AG said from 11800 Sunrise Valley Drive, Reston, Va. 22091.

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Chase Data Bases, 'Dissplа' Available On Interactive Net

WALTHAM, Mass. – Chase Econometrics Associates, Inc.'s forecasts, forecasting models, historical data bases and report services are now available on-line through the remote-computing facilities of Interactive Data Corp.

At the same time, the network has extended the reporting options available to its users through installation of the Dissplа package from Integrated Software Systems Corp. of San Diego. The package supports generation of plots and graphs of various types.

The Chase services include U.S. "macroeconomic," finance, industry, agriculture, insurance and international data. Subscribers can access these and Interactive Data's "wide range of supplemental data bases" through Xsim, a financial modeler's language.

The graphics services enable customers to generate four-color, 34-in. wide graphs off-line on a plotter located here in Waltham. Other graphs and plots can be produced on appropriate terminals at the user's location.

The choice of graphic output types and styles includes bars, pies, and curved line charts. It extends to "three-dimensional" viewing of objects with hidden line elimination if desired.

Dissplа capabilities are directly available to Fortran and Cobol programmers and to Xsim users through a simplified command language, Interactive Data noted.

The firm is at 486 Totten Pond Road, Waltham, Mass. 02154.

JES3 Training Course Highlights 'Externals'

AVON, Conn. – A three-day training course on the "externals" of IBM's ASP feature of OS and JES3 feature of OS/VS has been developed and is now available from Computer Systems Research, Inc. (CSR).

In the course, JES3 is compared with ASP, JES2 and Hasp facilities in varying degrees, depending on the backgrounds and current operating environments of those attending the classes, CSR said.

The course can be presented at selected locations throughout the U.S. or on-site at a particular installation. In the latter situation, the presentation will be customized to the needs of the sponsoring organization, a spokesman noted.

Registration fee is $450 per student, he added. Additional information about this and other JES3/ASP or JES2/Hasp training services is available from CSR in Suite 11, Avon Plaza, P.O. Box 45, Avon, Conn. 06001.

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'Cuffs' on Calldata

WOODBURY, N.Y. The Combs-Unangst Financial Forecasting System (Cuffs) now on the Calldata Systems, Inc. Comp/Utility time-sharing network, enables managers "to design corporate models that really work," according to Calldata.

Cuffs input language is both simple and flexible, the vendor claimed. Moreover, since the Comp/Utility mainframes – Digital Equipment Corp. Decsystem-10s – are "highly interactive," the whole input/output process can be done "on the spot," the spokesman said from 20 Crossways Park North, Woodbury, N.Y. 11719.

Site With DBMS Finds Shift to 370 Easy

By Catherine Arnst
Of the CW Staff

PORTLAND, Ore. – A data base management system (DBMS) is enabling the Benj. Franklin Savings and Loan Association, headquartered here, to give its customers "instantaneous service," according to Chuck Walker, vice-president for DP.

The association installed Datacom DB/DC (now marketed by Computer Information Management Co. [CIM] of Dallas) in the fall of 1971 on an IBM 360/40 under DOS. This year, a 512K 370/155 was installed and Datacom and related application programs were switched to an OS environment with no problem, Walker said.

"Because of our growth rate, the 360 simply ran out of soup. But we would have run out much faster without a DBMS," he said.

The association has 36 branches throughout the state servicing approximately 200,000 customers; Datacom supports a network of 104 Hazeltine 3000C terminals in those remote locations.

"We intend to double our network service within four years," Walker noted, adding, however, this should be no problem. The association's current hardware/software configuration has the capacity to handle about 100 branches, he believes.

Association management originally decided to install a DBMS because it needed to tie together relevant information about an individual customer from different files so it could be accessed quickly by a teller or branch manager.

"We need instantaneous recall when a customer walks in," Walker said, adding that the Benj. Franklin people want to be able to locate information about the customer's relationships with the association by name, account number, street address or any other identifier.

"We looked at everything on the market and found that none of them did the things we wanted," Walker recalled. His association especially wanted a generic search capability so a customer could be located quickly even when account numbers were not available.

The DBMS was constructed by CIM around Benj. Franklin's specifications and the association was its first user. "We've been extremely happy with it," Walker said.

The package's coding is fully reentrant, making it compatible with an on-line operation that handles a large number of transactions. Benj. Franklin uses it to control its communications network as well as to access files.

The association has one of the largest computerized savings and loan data banks in this state, Walker claimed, and under state law now allows access to that base by 11 other banks in the state who use the information to support appraisals and loans.

This service has been offered for the last three months "more as a cooperative venture than as a money-making operation" Walker said.

"We do not intend to get into that area in any big way. Our management philosophy is to service ourselves first," he said.

Data Basics

'UCC Three-Adam' Reports, Manages Disk Usage

DALLAS University Computing Co.'s (UCC) Automated Direct Access Management package – carrying the short name UCC Three-Adam – is said to control and manage direct-access device utilization and efficiency within an IBM-based OS environment.

The software provides this support, UCC explained, by working in three primary areas: Direct Access Storage Device (DASD) analysis; service aids; and allocation control. The analysis functions include reports on data set allocation and data set usage, the vendor added.

Developed by Kraftco Corp. of Chicago, UCC Three-Adam also provides complete pack layout descriptions, inventory of all data sets and summary of all available DASD space, UCC said.

Beyond that, it accumulates and reports trends of DASD usage in addition to serving as a real-time space usage monitor, a spokesman said.

Output from this phase of UCC Three-Adam serves as a basis for management analysis of the data center's use of disk space. With the information provided by the package, users should be able to reorganize the data sets for balanced improvement of space utilization and efficiency of operation, the spokesman said.

'Scratch' Processing

Meanwhile, the service aids phase of UCC Three-Adam's operation includes a controlled "scratch" processing to provide even more space for new data sets. Based on the monitoring feature, inactive data sets can be identified and selected for deletion so their space can be used for live work, he noted.

Once an installation has consolidated its DASD space resources, the allocation control phase of the package directs the allocation of new data sets to specific volumes and, presumably, to specific UCC Three-determined Extents on those volumes.

The package will work with all DASD units supported by OS or OS/VS, including shared DASD, UCC noted. It requires 64K for the basic reporting system, 12K for the real-time monitor and 2K added to the reader area for allocation control.

UCC Three-Adam can be acquired for $15,000 or $640/mo on a three-year lease from UCC at 7200 Stemmons Freeway, P.O. Box 47911, Dallas, Texas 75247.

A company spokesman also noted that UCC Six, a partitioned data set support package which can be used in combination with UCC Three-Adam, has been reduced to a one-time cost of $5,000 if acquired along with the newly announced software. Normally it costs $7,500, he added.

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Future Plans Important Also

Knowing Company Needs Key to Choice of Best DBMS

By Catherine Arnst
Of the CW Staff

WOBURN, Mass. – One of the major keys to choosing a successful data base management system (DBMS) is knowing your company and its needs, Sue Stone of Polaroid Co. said at a Computer Caravan workshop here.

A full understanding of the DP department, management, the departments using the system and the applications the company will require both now and three years from now is a necessity for selecting the appropriate package, she said.

Polaroid implemented IBM's IMS in 1972, she said. The system "was missing a lot of pieces and Polaroid had to spend a lot of money" finding those pieces, Stone said.

Now the state of the art has advanced so that more economical packages are on the market and better DBMS with the necessary tools integrated into them are available, she said.

"A well-thought-out, well-conceived and well-carried-out plan can get you a good DBMS," she said.

Other key points involved in the selection include management commitment, education of the staff, DP organizational changes that may be needed, procedural standards developed before the system is implemented and the tools needed to maintain those standards.

Weak Spots in DBMS

Polaroid encountered several weak spots in its choice of DBMS, Stone said. In 1973 hardware and software stability became a problem and emphasis was put on gaining that stability. Two multiterminal applications were also added that year, she said.

These included a procurement function which is used companywide and a manufacturing data base used by the film division.

By 1974 Polaroid's multivendor stability problem was solved, and regular meetings were set up with IBM to go over any future problems, Stone said.

A new problem emerged, however – a lot of downtime in the on-line environment in terminals and lines, she said. These were corrected through cooperation with the vendors involved, she said.

A rapid growth in on-line applications took place in 1975, with the number of applications going from four to 16, and the transaction volume doubled that year, she said.

This year, emphasis will be on improved control and coordination and an integrated data flow, she said.

Tool Additions

Stone outlined Polaroid's history of tool additions to its DBMS. In 1973, the company set up an application system project review, which she stressed as a key function in controlling the environment. It also helped to establish credibility with users, she said.

A batch terminal system was implemented in 1974, which Polaroid is "reasonably satisfied with," she said, and IBM's General Information System/2 (GIS/2) was added. GIS/2 was found most applicable for solving retrieval facility problems, she said.

Downtime was recorded manually that year, and a broad education program was started with the goal of educating everyone about everything, she said.

This was a wasted effort because so many programmers didn't use the information they learned until 1976, when they needed it, she said, and by then they had forgotten their previous training.

The lesson garnered from this mistake was "to teach it to them when they need it," she said.

Cross-charge improvements were added in 1975, so that the various company departments were charged more fairly for their usage, which also raised user confidence, she said.

A performance monitor was added that year, resulting in "too much output; a whole pile of paper was produced that would have taken forever to go through," she said.

"We wrote some summary programs of our own to identify peak programs," thus reducing that problem, she said.

In December 1975 a data dictionary was added, and "it should have been added earlier," she said. A data dictionary should be "married to a system from the start and naming standards should be developed from the start," she cautioned. "We didn't do that and it gave us problems."

Besides a data dictionary, a successful DBMS implementation also requires retrieval facility; IMS does not have one built in, which is a problem, she said. "Getting people to use them is also a problem," she added.

Data Base Administrator Role

The role of the data base administrator was described by Stone as a job which can be all things to all people. "In IMS the function would be to do mapping of data to show how it is physically stored," she said.

At a recent IBM users group meeting she attended, Stone said many companies said they take all the new jobs that come with a DBMS and give them to one department with a large group of people in it.

At Polaroid, "all these functions are performed by people in the DP department," she said.

"A lot of people try to make some one person in the organization responsible for data content," she added.

A workshop participant described a system developed and used at Bell Laboratories, built on a DBMS, which keeps track of the reliability of units manufactured by Bell.

It is constantly upgraded, which saves programming time and efforts, he said, and it has the capability of handling up to 15 special reports.

This system fit Stone's description of a DBMS as "a starting block for a system developed by the company to suit its own needs," she said.

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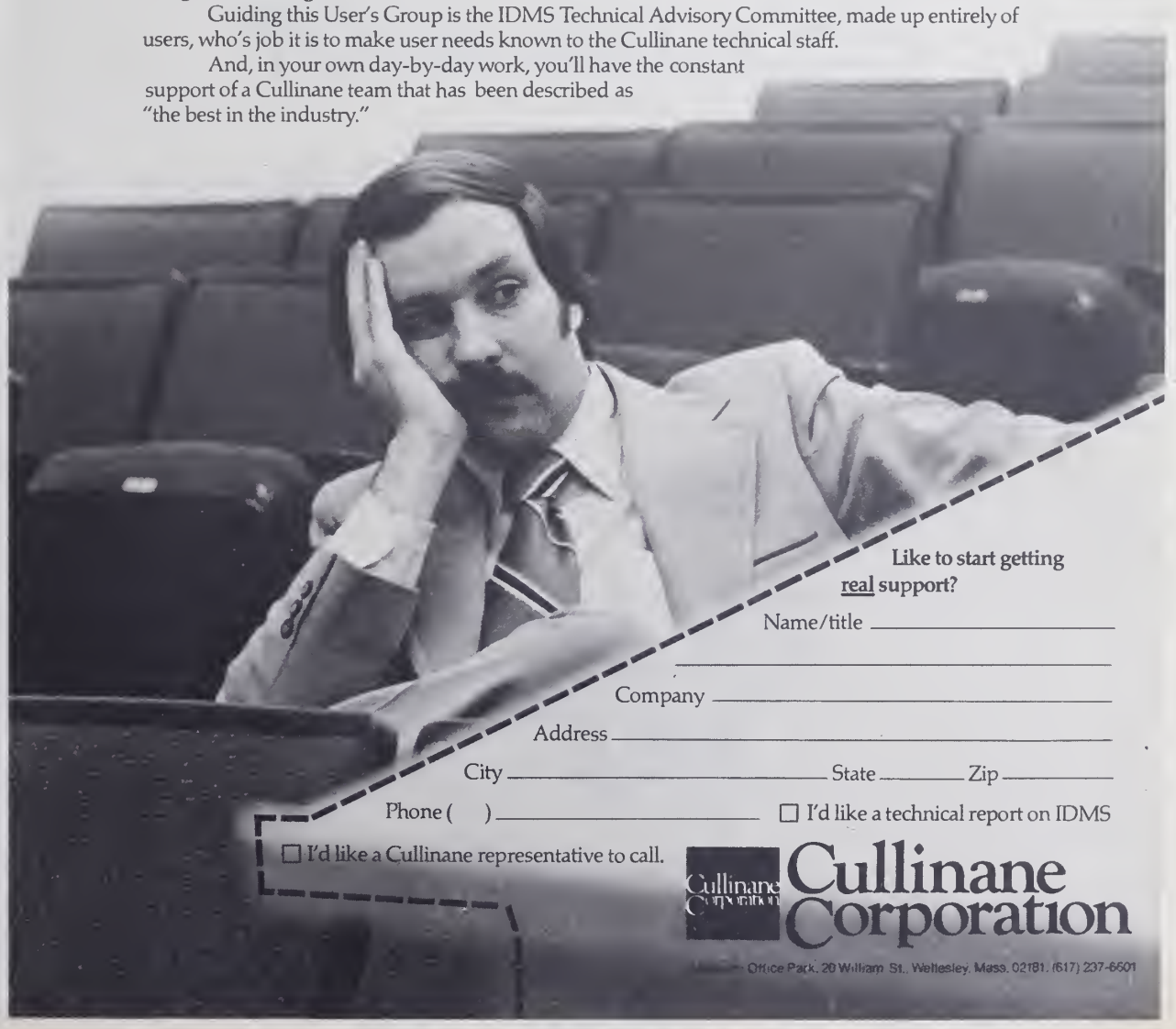
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Choice of Correct JCL Entries Important to Gain RPS Benefit

By James D. Radosevich
Special to Computerworld

FALLS CHURCH, Va. – The anticipated benefits of Rotational Position Sensing (RPS) on IBM 3330 disk systems – faster data transfer, for example – do not come to an installation automatically.

Performance Evaluation

Working with a Tesdata 1155 hardware monitor, we at the Naval Audit Service ADP Management Audit Branch have tracked disk activity on IBM mainframes with 3330- and 2314-equivalent disk drives.

We were surprised to find similar data transfer ratios for the two types of systems, but further research seemed to show why we got such results.

In one situation, we were looking at an IBM 360/65 with three 2860 selector channels leading to California Computer Products, Inc. (Calcomp) 22 disk banks. The other configuration was an IBM 370/165 with two 2880 block multiplexer channels and Itel 7330 disk units.

The data transfer ratios, (calculated by dividing channel-busy (OP-IN) time by data transfer time), are shown in the following table.

Data Transfer Ratio:

3330-Equivalent	2314-Equivalent
4.036	5.71
4.623	4.15
2.029	5.45
2.048	4.70
	3.25
	4.91

The similarity in the ratios was surprising in view of the RPS feature of the IBM 3330 and its equivalents.

RPS is supposed to increase system throughput by freeing the channel and the disk control unit during most of the record search time. Therefore, the OP-IN time should approach data transfer time on RPS devices, and the data transfer ratio should approach one.

We were somewhat concerned that our readings might have been affected by using a 3330-equivalent system rather than the 3330 itself. Unfortunately, even IBM was unable to find us a "pure IBM" shop of roughly the same size so that we could run a conclusive test on that point.

Blocking (Byte/Block)	OPTCD (△=Not Used)	Data Transfer Ratio (OP-IN ÷ Data Transfer Time) RECFM=FB Write	RECFM=FB Read	RECFM=FBS Read	RECFM=FBS Write
100	△	6.51	6.18	5.27	6.54
100	Z	6.49	5.07	NA	NA
800	△	2.66	2.69	1.69	2.66
800	Z	2.66	1.68	NA	NA
3,100	△	1.94	2.20	1.21	1.94
3,100	Z	*	*	NA	NA
6,400	△	1.59	2.10	1.11	1.59
6,400	Z	*	*	NA	NA
13,000	△	1.05	2.05	1.05	1.06
13,000	Z	*	*	NA	NA

NA=Not Applicable
* = Test not conducted because results should approximate those for RECFM= FBS

Results of a controlled test on IBM block multiplexer channels with 3330-equivalent disk banks attached.

Further Research

However, further research into RPS through contact with IBM and Itel and through controlled testing on the 3330-equivalent disk banks revealed the following:

- RPS is implemented primarily by way of Record Ready and Mod Select signals between disk drives and their respective control unit. These signals produce a disk drive "access window" during which a channel may connect to the disk drive. If the channel is busy during the access window, it may not connect to the drive.

For strictly IBM equipment, the access window is a constant 130 μsec per disk revolution beginning two sectors before the desired sector of the disk moves under the read/write heads. For IBM-equivalent equipment, the window may become as long as 33 msec.

The larger the window, the longer the control unit becomes dedicated to searching for records on a single disk drive.

- RPS must be implemented by the user for sequential data sets. The channel programs for sequential access methods are structured so a user may double channel and disk control unit busy time by not judiciously selecting Data Control Block (DCB) parameters in the Job Control Language (JCL).

If the user selects RECFM=F or FB he should also select OPTCD=Z. If the user selects RECFM=FS or FBS, he will automatically get all the features of having OPTCD=Z.

The OPTCD=Z parameter requests search direct in the DCB. If the Z option is not selected, the channel control program will locate the previous record read, skip over it and then read the desired record.

If OPTCD=Z is selected, the channel program will locate the desired record directly. The Figure illustrates the benefit of selecting the proper DCB parameters.

- The closer data sets are blocked to full track blocks the better the data transfer ratio becomes.
- When allocating more than one cylinder of IBM 3330 disk space, it is better to allocate by cylinders rather than by tracks. If track allocation is used, an operation which causes a head switch will result in the channel program being interrupted by a file mask violation, and possible loss of a disk revolution will result.

Radosevich is a systems analyst with the Naval Audit Service ADP Management Audit Branch.

National CSS Backs Micro Use

NORWALK, Conn. – Program development software for Intel, Texas Instruments, Fairchild, National Semiconductor and several other microprocessors is now available on the National CSS, Inc. network, a spokesman said from 300 Westport Ave., Norwalk, Conn. 06851.

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FCC To Reconsider 1971 Computer Inquiry Findings?

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – The Federal Communications Commission (FCC) may soon reconsider its original findings in the 1971 Computer Inquiry which set the boundaries between computer and communications services.

The reopening of the inquiry was predicted by Walter Hinchman, chief of the FCC's Common Carrier Bureau, in a recent speech before the Computer Industry Association.

"Carriers – and particularly Bell – are beginning to offer some smart terminals such as the Dataspeed 40 and the Transaction Telephone. Are these mere communications terminals? Or are they data processors?" Hinchman asked.

He contrasted these recent Bell offerings with equipment available in 1971, when the original Computer Inquiry decision was handed down by the FCC: "There was nothing particularly esoteric. Bell and Western Union were offering teleprinters under tariff and, in addition, some paper and magnetic tape communications terminals . . .

"The teleprinter which was widely used in the Telex, TWX and private line services was finding new applications as an interactive terminal," he said.

Concrete Evidence

The FCC is now beginning to acquire "some concrete cases and applications which we were not able to cite in our 1971 order," Hinchman said. These "newly acquired precedents" might prove useful in "resolving some of the ambiguities which are now apparent" in the Computer Inquiry decision, he added.

"It is becoming more and more apparent that we shall wish to reexamine our 1971 [findings] to make them more relevant to the changing conditions of 1976," Hinchman said.

The 1971 ruling drew the distinction between data processing services and message- and circuit-switching services. The first should not be regulated, it was ruled, while the latter two were communications services and subject to regulation, he explained.

The decision also said that remote DP services and hybrid DP services (those with incidental communications) should not be regulated, he noted. On the other hand, services which had incidental DP components but were primarily communications-oriented were regulated under the 1971 decision.

In a review of other important issues now pending before the commission, Hinchman said "we are about to issue the findings resulting from an inquiry into the appropriateness of some of the present restrictions [imposed by carriers] on the sharing and resale of common carrier services."

A considerable amount of this activity is presently going on, he said, and a decision in this proceeding is expected "within the next month."

On-Line Net Helps Small Businesses Afford DP Power

By John P. Hebert
Of the CW Staff

CHERRY HILL, N.J. – An on-line, real-time communications network here is helping provide small businesses with the DP power they need and would use in-house – if they could afford it.

The management information supplied by Compudial, Inc., a service bureau, on its five-state network includes inventory control, billing, accounts receivable, sales, commission reporting, invoicing and aging reports, according to Stephen Edenbaum, company president.

Supports 95 Users

The Compudial network supports some 95 users in New York, New Jersey, Pennsylvania, Connecticut and Maryland during daily business hours, Edenbaum said.

The system is centered around an NCR 201 mainframe with 280 ports which customers can access through dial-up phone lines, he explained.

At the user's end of the network, General Electric Terminet split-platen teleprinters operating at 30 char./sec handle the business transaction workload.

The system was designed to provide an easy to use, low-cost interactive service to wholesalers, distributors and manufacturing clients "who may not wish to make the investment in time or money necessary to install their own in-house system," Edenbaum noted.

"Because the cost of the system is based on business activity, the client uses and pays for only what he needs," he said.

Pricing Snag

In attempting to keep costs low, Compudial was confronted with a communications problem last year when New Jersey Bell Telephone changed the tariff structure on business phone calls. This would have translated into higher rates for Compudial's users, according to Tom Eaton, vice-president of systems and programming.

Phone rates were changed to include a charge for the duration of a call in addition to a charge for the call itself, Eaton noted.

"We put a dial rotary in downtown Philadelphia, and provided local numbers to call, which placed some customers under the metropolitan Philadelphia tariff rating system," which charged only for the call itself, he said.

Similar Treatment

A similar method was used to take northern New Jersey users off the higher rates, he said. The customers there were put on the metropolitan New York City area tariff structure.

Six Compudial subscribers are hardwired directly into the Cherry Hill CPU because of their proximity, Edenbaum noted.

An Infotron Systems Corp. Time-Line 180 time division multiplexer receives data from Vadic Corp. autoanswer modems in downtown Philadelphia and transmits it to Codex 9,600 bit/sec modems in Cherry Hill, Eaton said.

"That was the cheapest way to go," he said.

Response Time

The response time of the network is about 5 sec, Eaton said. "Sometimes it exceeds that, but 5 sec is our goal."

The split-platen printers help cut user costs by simultaneously providing two forms of the computer-generated information, Edenbaum noted.

The teleprinters can be used to complete preprinted forms on the left platen, while the right platen can be used for system entry instructions.

"This type of teleprinter has provided flexibility to our computer program and allows the single teleprinter to be used instead of employing two separate printers," he said.

Remote Batch Terminal From GA Based on 16-Bit Microcomputer

ANAHEIM, Calif. – General Automation, Inc. (GA) has introduced a remote batch terminal based on a 16-bit microcomputer which is said to accommodate communications to and from a remote CPU.

The RBT-1 can provide high-speed data transmission through direct connection or common carrier lines, according to the company.

The basic terminal includes a GA-16/220 processor with 8K- by 16-bit semiconductor random access memory, teletypewriter and controller; controllers and cables for card readers and line printers; all power supplies; and a communications emulator package.

Emulators are available that provide compatibility with IBM 360/20 Hasp workstations, Control Data Corp. 200 user terminals and Univac 1004 systems, GA said.

Three optional sets of card reader/line printer combinations are offered which are said to allow the user to customize his terminal to his data rate requirements.

These include 285 card/min and 200 line/min reader/printer pairs for data rates less than 2,400 bit/sec; 400 card/min and 300 line/min pairs for 4,800 bit/sec operation; and 600 card/min and 600 line/min pairs for data rates from 7,200- to 9,600 bit/sec.

In addition, the company said, an 80-character, 24-line CRT and 35 card/min card punch may also be specified as options.

The price of a basic RBT-1 is $10,800, GA said from 1055 S. East St., Anaheim, Calif. 92805.

Weir Test Unit Works in Field

SUSSEX, England – Weir Instrumentation Ltd. has introduced an electronic field instrument for computer and communications servicing.

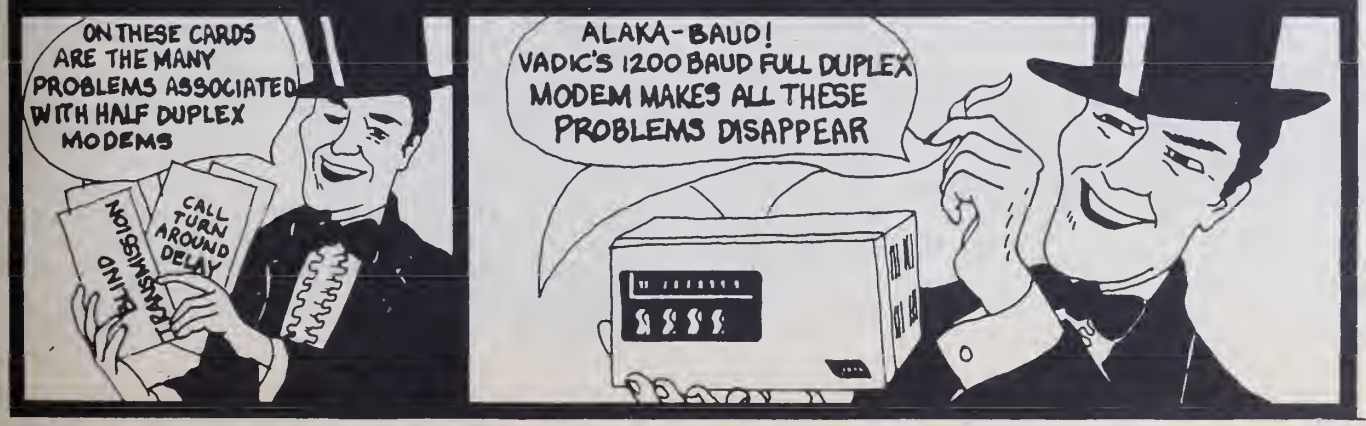
The DTM 1000 field datameter is a pulse-measuring instrument and digital multimeter which is said to provide a single test facility to replace separate oscilloscope, pulse-counter meter, frequency meter and digital multimeter units.

Functions include frequency measurement, pulse-width timing and two-line terminal measurement. The unit's indicator lamps can monitor input pulse levels and show whether logic signals cross preset high and low threshold voltages, the firm said.

The set has separate inputs for standard TTL 5V logic circuits and for high impedance MOS circuits operating at adjustable voltages between -30V and +30V.

The instrument is supplied with accessory leads, a stand and spare fuses. Specialized versions of the unit can be developed to meet the requirements of large-volume customers, Weir said from Durban Road, Bognor Regis, Sussex, England.

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Going On-Line a Venture to Approach With Caution

By Catherine Arnst
Of the CW Staff

WOBURN, Mass. – Going on-line is "a whole new world, and if you do it wrong you're in big trouble," Richard Foley, executive vice-president of Bankers Data Processing (BDP) cautioned attendees of a workshop at Computer Caravan '76 here recently.

BDP has been on-line for 10 years with a private line terminal network. It services 1,500 terminals used by 3,000 tellers and handles 350,000 transactions per day.

Before switching to an on-line network, a company must first make an evaluation of "what it's doing today and where it will be in the future," he said. Foley recommended talking to others in the same industry who have adopted an on-line network.

A company must determine whether the cost of such a system would justify the change. At BDP, Foley claimed several gains.

The input function was reduced, thus lightening the clerical workload, he said. BDP once needed six clerks for 11 banks; it now has eight clerks covering 200 banks.

Going on-line also lowered the number of errors made, consolidated information so it is quickly accessed and enabled member banks to have up-to-the-minute data so their money is always working.

With the old system, a job was handled twice, first by the teller and then again when the information was input to the mainframe. Now, a terminal can be kept at the original source data so that only one entry per transaction is needed.

An on-line system allows more supervision over operations – some terminals require a supervisor key to perform certain transactions, guaranteeing that risky transactions will always be reviewed.

Several Types Available

There are several types of terminals available for consideration, Foley said. He first mentioned hard-wired terminals, such as any teletypewriter. This type has definite restrictions, such as a small, inflexible buffer system, which shifts the burden of processing all data to the mainframe, he said.

He warned that a user probably won't want to use one kind of terminal forever, so "it would be nice to have a fixed input format."

When considering dial-up vs. private phone lines, the main consideration should be cost, Foley said. "A private line is more expensive, but it saves money in the long run," he said.

"However, you may need a combination of both," he added. "A lot depends on the volume of business you do. If you use dial-up more than four or five hours a day, you would save money by going private line."

A stand-alone device with core memory is probably the best terminal to go with, Foley said. It can run independent, off-line, on-line or do batch collection, he said.

It's best to shop around when looking for terminals, he suggested. "There are good ones, garbage and overpriced ones on the market. I think there are as many terminals on the market as there are people in the U.S.," he said.

A top priority while shopping around should be the availability of servicing, he emphasized. "If you're running with a real live environment, you have to be sure you get service in the real world," he said.

The problem with small terminal manufacturers is that they

Terminal Transactions

"often can't provide adequate servicing, even though they may be selling a good product," he said.

It would be advantageous to ensure that the terminal selected can operate off-line if the system goes off-line, he said.

"Check how fast a terminal can run, and anticipate that you will grow and need more speed. Be sure to check costs of increased speed also, he said.

The key to your operation is that "it's got to be kept simplistic," he said. "Don't buy a dog – one that's too complex."

A technique which can be considered by companies going on-line is bridging – the process of running several different lines from distant sites through a bridge which consolidates them into one line sent to the mainframe. Since line costs are paid by the air mile, this cuts down on costs by cutting the number of lines needed, he said.

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Already Tested on RPG-II

Adds Consul 890A Works With IBM 3

HAUPPAUGE, N.Y. – Applied Digital Data Systems (Adds) has introduced support which it said allows its Consul 980A CRT terminal to be used with an IBM 3.

The CRT was operated successfully on a 3 using RPG-II and IBM's Multi-Line Multi-Point (MLMP) macro support, the company said.

An Assembly language program was written to interface the RPG-II program to MLMP, it added.

MLMP is a binary synchronous communications feature of the 3/10 and 3/15 disk systems.

MLMP provides access to the binary synchronous I/O routine that supports the Binary Synchronous Communication Adapter (BSCA), Adds said.

To support a 980A on a 3, the user can use the BSCA (IBM feature 2074 or 2084) and Ascii transmission code (IBM feature 9061 or 9071), a spokesman said.

As an alternative, an EIA local attachment (IBM feature 3601 or 3602) can be used to take the place of the multipoint lines and modems, Adds said.

The EIA local attachment can run at 2,400-, 4,800- or 8,000 bit/sec, it added.

The terminal can also be attached to 3/10s through Digital Systems Corp.'s ISC terminal adapter, which provides asynchronous terminal support, Adds said from 100 Marcus Blvd., Hauppauge, N.Y. 11787.

Terminal Transactions

Order-Processing Networks Target Of Condon CRTs

BEDFORD, Mass. – Communications terminals designed to facilitate implementation of an order-processing network have been introduced by Codon Corp.

The Codon Model 12 and Model 20 CRT terminals can be used in a stand-alone capacity or extended, in building-block fashion, as part of an order-processing network, according to a company spokesman.

The terminals are said to be capable of fulfilling the functions of a dedicated processor, multiple video transaction devices, disk storage, printers and communication facilities.

The Model 20 is intended as a hub, with other sites in a distributed processing network tying into it, the spokesman said.

With the addition of a magnetic tape device, the Model 20 could be an automatic dialer with store and forward for polling operations, he said.

Codon's Model 12 was designed to be a satellite in a distributed processing network. It can accommodate up to two remote hard-copy or CRT terminals as peripheral devices, the spokesman said.

Both terminals operate in binary synchronous "standard industry" communications, he said, and both can directly communicate with IBM 2780 or 3780 terminals.

The terminals transmit at 2,400 bit/sec using a Bell Dataspeed modem; with hardware and software support, the units can support communications speeds up to 9,600 bit/sec, he noted.

There are also Autocall and Autoanswer features which allow the units to interface with Bell's 801 automatic dialer.

In addition to the hardware, the company is offering ready-to-use application packages and the tools which permit them to be modified to meet special requirements, it said.

The Model 12 terminal with 6.5M-bytes of disk storage and a single video transaction unit is priced at $32,000; the Model 20 has a purchase price of $37,000, the spokesman said from 11 De Angelo Drive, Bedford, Mass. 01730.

Tycom Cuts Model 38 Price 11%

FAIRFIELD, N.J. – Tycom Systems Corp. is offering an 11% price reduction on its Ascii, teletypewriter-compatible IBM Selectric terminal.

The Model 38 terminal can be used to transmit data directly to mini- and microcomputers and CRT displays or over standard telephone lines via customer-applied or optionally built-in phone couplers, the company said.

With an Ascii-compatible tape cassette, data can be typed at normal typewriter speeds, then batch processed at switch-selectable speeds up to 1,200 bit/sec from the cassette, it added.

The Model 38 terminal was designed for office administration applications requiring printing in financial, manufacturing, banking, insurance and brokerage operations in addition to time-sharing use.

The price of the terminal has been reduced to $1,995 from $2,250, Tycom said from 26 Just Road, Fairfield, N.J. 07006.

Users Planning Nets A

By John P. Hebert
Of the CW Staff

WOBURN, Mass. – When contemplating a data communications network, a user's "best option is to go for the minimum cost" and the least complex solution to meet his needs.

This was the answer to several questions posed by attendees of a Computer Caravan workshop session here recently entitled "Network Transmission Methods and Options" and given by Art Dubnow, DP manager of the Northrup Co.

Dubnow also advised users deciding whether to implement a communications network or manually carry the data to the CPU to "stay away from a communications network.

"Not all the bugs have been taken out yet," he warned.

"Most of the screw-ups in a network are not the hardware or software, but rather in the area between the modems" in almost any installation, he noted.

By far the biggest problem in this area, Dubnow commented, is line noise. And the worst cases

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Computer Security Institute announces two new workshops designed to protect your installation from fire, fraud and negligence.

1. Computer Security Risk Management

The objectives of this workshop are: 1) To convey the importance of risk evaluation and why it should be the first step in any computer security program. 2) To provide a thorough understanding of how to evaluate and classify risks, and quantify threat probabilities and loss exposures. 3) To provide a methodology for evaluating countermeasures on a cost benefit basis.

Threats & Vulnerabilities - Risk analysis begins by methodically isolating and quantifying potential DP loss exposures. For example, what would happen if your DP operations were disrupted for an hour, a day or a week? What would be the cost to replace your hardware, critical programs and data files? And how would the alteration or public disclosure of your proprietary data files affect your organization? Following the identification of these loss potentials, we'll evaluate the threats that could produce them, including natural disasters like fires, floods and earthquakes, or air conditioning failures. Plus the problem of unintentional human errors, and problems deliberately caused by unethical employees and outside perpetrators.

Probabilities of Occurrence & Annualized Loss Expectancies - The next step in quantifying DP risk is to establish a probability of occurrence for these threats. For some types of threats (fire, tornado and power outage), estimating the probability of occurrence can be relatively easy. For other types of threats it can be more difficult, as in the case of fraud and sabotage. You'll see how these probabilities are generated, and you'll be shown how to apply them. Determining an annualized loss expectancy is the final step in quantifying risk. It is the product of the potential dollar loss and the probability of occurrence.

Countermeasure Selection - We'll show you how the risk analysis output ties directly into the evaluation of various risk reducing alternatives. The cost effectiveness of a proposed security system or procedure can be determined by comparing the cost of the system to the annualized loss it is expected to reduce or eliminate. Rational decisions can now be made as to the appropriateness of physical and data access control systems, UPS, back-up air conditioning, fire protection and other preventive and remedial alternatives.

2. Physical Security & Disaster Recovery

The objectives of this workshop are: 1) To provide you with an overview of the nature and scope of physical security, vital records and disaster planning, and demonstrate how they relate to the overall computer security program. 2) To help you identify physical threats and evaluate the cost effectiveness of various protection mechanisms, including physical access control systems, fire detection and control systems, uninterruptible power systems (UPS), and water, temperature, humidity and dust control systems. 3) To develop a framework for disaster recovery planning to be used in designing and implementing your own program.

Physical Security - How it fits into the total program.
An overview of physical threats, including fire, flood, tornado, earthquake, vandalism, temperature, dust and humidity.
Analysis of protection principles: Threat removal and threat isolation.
How to conduct a vulnerability survey. . .and what to do with the results.
Facility construction and siting: selection, retrofit, architects, engineers.
Controlling access to sensitive areas: devices and techniques.
Fire prevention, detection and extinguishment.
The power problem: power company practices, transients, brownouts, blackouts.
How to determine requirements for protective equipment.
Water damage control: leakage, flood.
Vital records protection: how to identify and classify. Why quality assurance?
Protection techniques: on and off-site, on-line. Implementing a vital records program.

Disaster Recovery - and how it integrates with overall organizational plans.
Local police, civil defense.
Emergency response: the need for preparedness and immediate reaction.
Site selection, legal implications.
Backup operations - compatibility, task vs. time sensitivity.
Recovery: site preparation, EDP hardware supplies procurement.
Monitoring and testing the recovery plan: DP staff, security staff, key executives.

Computer Security Institute is a multi-service organization dedicated to providing DP users with information on how to safeguard their valuable EDP resources from damage or loss. Services include: a bi-monthly newsletter, research, a test program, computer security manual, buyers guide and seminars.

What's different about these workshops?

Workshop Counseling - Before and after each workshop, a Computer Security Institute instructor will consult with you via telephone. The aim is to help you identify problem areas in your own installation and at the same time encourage you to set specific objectives before attending. It's optional. . .an added "extra" offered at no additional cost.

Attendee Preparation and Research - Before each workshop we'll send you course materials and you'll be expected to familiarize yourself with it beforehand. We'll also ask you to check out your installation before the workshop begins, noting what problem areas require improvement.

Workathon - These accelerated two-day programs are designed for professional people who are willing to work and think hard. We've developed the "Workathon" environment to painstakingly explore the unique problems of each attendee and respond with practical information.

Small Workshops - Two workshop Leaders - Workshop attendance is strictly limited to 25 participants to maximize the opportunity for interchange between the workshop leaders and participants. Two Computer Security Institute faculty members will lead each workshop.

Special Interest Sessions - On the evening of the first day, we'll meet in small special interest groups. You should participate in these voluntary sessions because they'll focus on problem areas you've identified as important.

Awards - A rigorous examination concludes each computer security workshop. If you successfully complete this test - and passing is not automatic - you will receive a personalized Computer Security Institute citation in recognition of your achievement.

Here's what attendees have said about their experience at the latest Computer Security Institute sponsored program:

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"The most professionally run conference I've ever attended."
David L. McGuire, Manager of Computer Operations, Skelly Oil Company, Tulsa, Oklahoma

"In spite of the criticisms offered, I learned many times more than I expected, this was a super experience. Excellent quality of information, schedule outstanding."
First Lieutant Samuel T. Marsh, U.S. Marine Corps.

You should Attend if you are responsible for any aspect of your company's computer security program. This includes DP Managers • Auditors • Risk Managers • Consultants • Security Officers • Systems Analysts • Facility Planners • Staff Accountants • General Management

Registration: The charge for each two-day workshop, including continental breakfasts and luncheons, comprehensive workbook and all course materials is $350 per registrant, payable in advance. Computer Security Institute members are entitled to a special discount: the fee for "Unbundled" members is $295 per registrant, and the fee for Full Service members is $225. Hotel fees are not included in your tuition cost, but we have reserved a block of rooms at the workshop hotels, and many of these hotels offer preferential rates. A room reservation card will be included with the acknowledgement of your workshop registration. Remember, enrollment in each workshop is strictly limited to 25 participants on a first come basis.
Registrations cancelled up to 7 days in advance of the workshop will be refunded in full. Thereafter, if you cancel without sending someone in your place, a $50 service fee will be charged.

Workshop Faculty



Peter S. Browne, Workshop Chairman is Manager of Security Operation for the G.E. Information Services Business Division. Prior to joining G.E., he was responsible for the development of the computer security program at State Farm Mutual Auto Insurance Company. He has dealt with security of computer information as a staff officer in the Air Force. Mr. Browne is active in many national professional societies, was chairman of two ACM chapters and frequently speaks on the subject of computer security.



Belden Menkus has spent over twenty years helping management improve administrative systems and information handling techniques. He is Editor of the Computer Security Institute's *Computer Security* newsletter. He is a regular contributor to *Administrative Management* and an advisor to *Security Letter*.



Robert V. Jacobson is an Assistant Vice President of Chemical Bank where he is responsible for Information Systems Security. His experience includes computer simulations of weapons and radar systems at Raytheon Company. He later joined Bolt, Beranek and Newman, Inc. and served as General Manager of TELCOMP. He founded Bradford Associates, Inc., and specialized in computer security consulting.

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Bits & Pieces

Xerox 1200 Now for Sale

EL SEGUNDO, Calif. – The Xerox 1200 computer printing system can now be purchased in the U.S. at a price of $145,000, the company announced.

The nonimpact xerographic printer, previously available on a lease basis only, prints data unsensitized 8-1/2-in. by 11-in. paper at approximately 1 page/sec or 4,000 line/min.

Users with leased machines may convert them to purchase, with credit for rentals covering up to 20% of the purchase price, Xerox said.

Remex Adds Reader/Spooler for NC

SANTA ANA, Calif. – Remex has brought out a "work horse" paper tape reader designed for applications where economy is of prime importance, according to the vendor.

Features of the RRS7200 make it an appropriate reader/spooler for numerical control (NC) work centers, NC controllers and similar applications, the firm said. The unit offers 200 char./sec asynchronous read speed and 300 char./sec synchronous speed.

Employing a fiber optic light distribution system, the unit reads paper or mylar tape of five to eight levels with infrared transmissivities to 57%, Remex said.

The RRS7200 costs $1,045 from the firm at 1733 Alton St., Santa Ana, Calif. 92705.

Four-Phase Users Plan Meeting

SADDLEBROOK, N.J. – A meeting of the Four-Phase Users' Association will be held on March 24 at 9:15 a.m. at the Holiday Inn here.

The Agenda will include general business, bylaws, further plans for the annual meeting in Cupertino, Calif., and communications.

Further information is available from Arlene J. Gale, publicity chairman, at Burlington County Memorial Hospital, 175 Madison Ave., Mount Holly, N.J. 08060.

Clarifications

Raymond Engineering, Inc.'s ruggedized 1/4-in. tape transport [CW, March 1] costs under $3,500 in small quantities.

Data Processing of the South [CW, Feb. 23] is in Charlotte, N.C.

The purchase price of the Control Data Corp. Map III array processor [CW, Feb. 16] is $325,000 plus a $15,000 installation charge.

An Unlikely 470V/6 Rival

APS Not Indicative of Next Generation

By E. Drake Lundell Jr.
Of the CW Staff

NEWTON, Mass. – If IBM is readying a machine for the top-of-the-line mainframe user as many expect, the recently announced 370/168 Attached Processor System (APS) isn't it.

In fact the system fits into the IBM line under the firm's largest system and at a price that will not be attractive to users considering the Amdahl Corp. 470V/6.

The existence of that system, with which Amdahl has been making steady inroads with IBM large-system users, had led many in the business to speculate IBM would offer users a similar unit.

At the same time, many felt that the unit expected from IBM would be the top model in the firm's line and that it would clearly signal the direction IBM is planning to take in its next generation of computers.

The APS [CW, Feb. 23] does not fulfill any of those expectations to a significant extent.

The IBM unit is similar to the 470V/6 on a performance basis, giving IBM salesmen something to offer users looking at the Amdahl system, but it does that only at a significant increase in price.

The APS is approximately 1.5 to 1.8 times as powerful as the "plain vanilla" 370/168 Model 3, while the Amdahl unit is claimed to be 1.5 to 2 times as powerful as that unit. Clearly, the CPUs are in the same performance range.

But the Amdahl system comes in at approximately the same price as the 168 Model 3, while the APS will cost users 1.5 to 1.8 times as much. And the Amdahl 470V/6 comes with 16 standard channels, while a similarly priced APS would have six to eight channels.

Analysis

So the user considering the 470V/6 to get increased performance would probably stay with the 470V/6 at the lower price rather than opting for the higher priced (for the same performance) APS system.

That is, unless the IBM name and reputation for service are worth a price differential of 50% to 80%, which may be what IBM is betting on.

At the same time, the system may be more attractive to users who have been considering the 370/168-3 multiprocessing system, which is currently the top of the IBM line, except for the mammoth 370/195.

(Continued on Page 33)

Users Seen Coming Out Ahead With Independents' Peripherals

By Kathleen P. Quinn
Of the CW Staff

WOBURN, Mass. – The user can often come out ahead by using independent peripherals, Joseph Berns told a workshop audience at the Computer Caravan here recently.

In a competitive market comprised of about 160 small- and medium-sized companies, price and product battles are common, the Price Waterhouse & Co. consultant said.

The advantages of a mixed system with peripherals from independents are so significant that they make any disadvantages "negligible," Berns claimed.

First on the list of pros is the "significant cost reduction" purchases from independents afford, he said.

Another advantage is more flexibility in negotiating than the mainframers will allow. Independents are normally more willing to bend on conversion to purchase agreements, upgrading and termination penalties, he added.

Other common advantages are improved performance, better delivery time and a closer match with the needs of the system or organization, Berns said.

The capability of the independent peripherals to extend memory beyond that offered by the mainframers' equipment is another consideration, he added.

One of the disadvantages of a mixed system is the problem of divided maintenance responsibilities, according to Berns. Multivendor "finger pointing," however, is an area of concern which has been overemphasized, he said.

Compatibility is also sometimes a problem, and the lag between the time the mainframer announces a product and the time the independent peripheral maker produces a compatible product can also be a factor, he said.

The keyboard device mart seems to be an area in which users are very likely to use products from independents, Berns said. The $700 million market was responsible for about 30.4% of the total independent peripheral mart in 1974.

The keyboard market is also the most competitive and is believed to have the largest growth potential, Berns said.

The rising popularity of distributed processing and on-line systems is expected to contribute to this growth, he

(Continued on Page 33)

School Scraps Vendor's Memory, Boosts 370/155's Performance

By Esther Surden
Of the CW Staff

HOUSTON – An independent vendor's processor speed enhancement is helping Rice University here get better throughput on its IBM 370/155 mainframe, the user said.

Rice originally acquired the 370/155 in August 1972 with 1M byte of IBM-supplied memory. As processing requirements increased, the university added 1M byte of Electronic Memories and Magnetics Corp. (EMM) memory.

Eventually, Rice replaced all the IBM memory with EMM memory, according to Dr. M. Stuart Lynn, director of the Institute for Computer Services and Applications.

When the need for further enhancement was seen in 1974, the university considered expanding the system, adding more memory or upgrading to a larger IBM mainframe.

The school decided to add the IBM Dynamic Address Translation (DAT) feature that allowed it to operate in a virtual memory environment, Lynn said.

Then, last year, when this expansion seemed still inadequate for its needs, the school decided to install a Processor Speed Enhancement (PSE) from EMM. "It was a natural way for us to go," Lynn said, adding "we avoided having to consider a faster CPU."

Two Major Benefits

The PSE has worked "beautifully," Lynn said. There have been two major benefits from the installation of the enhancement, he noted.

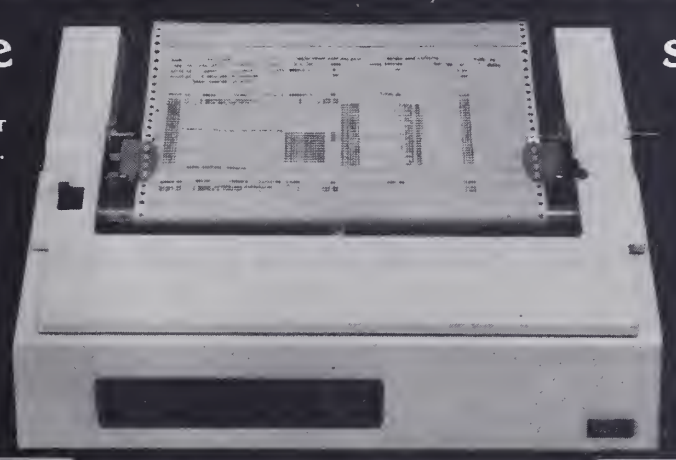
First, the PSE has improved the mainframe's performance. "Now we can take better advantage of the memory and have better overall performance of the operating system," he said.

The unit has also reduced the amount of CPU time each user needs, Lynn added.

(Continued on Page 33)

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Disadvantages Seen 'Negligible' With Independents' Peripherals

(Continued from Page 31)

added. Intelligent terminals, remote data entry devices and interactive CRTs are key products in this area.

In disks, replacements for the IBM 2311 and 2314 are still available, but are being phased out, Berns said. The 3340-type product has been a problem because of the electronics in the disk pack, but the future remains "encouraging," Berns said.

Independents' tape products have, as elsewhere, filled gaps in the IBM equipment line. Several firms offer products similar to the 3410 and 3411, Berns said. Another popular product is the 3420-type unit.

Add-on memory products is an area in which the independents have a good track record, Berns said. It is one of the most active areas in the peripheral mart, he added.

Add-ons can offer users up to a 50% savings and, on a 360, up to an 80% cost reduction, he said.

There are three types of add-on memory available, Berns said. But add-on memory, which is used to extend the capability of a present memory system, may irritate an IBM representative, he continued.

Replacement memory, which would completely take the place of the mainframers' memory, could really irk an IBMer, as would enhancement memory, which extends a machine's memory beyond the limits of the mainframer's equipment, Berns said.

However, because IBM does not lease add-on memory for purchased CPUs, these products are very much in demand, he said.

In addition, since IBM's next generation of equipment is not expected for some time, this equipment should have a fairly long lifespan, Berns added.

APS Not Indicative Of Next Generation

(Continued from Page 31)

The 168-3 costs only 20% more than the APS system, and for users that don't need a strict multiprocessing system with separate memory and I/O capability, the APS system may be the way to go – particularly if they want to stay with IBM rather than go to an outside CPU supplier.

But while the APS may give IBM salesmen something to talk about to users considering Amdahl on a performance basis, it clearly does not fulfill the expectations of an advanced technology system indicating the path the firm is going to take with its next generation.

The technology for the unit is not new. The system is basically a stripped-down 168 Model 3 without main memory, attached to one that has main memory and I/O capability, since the "attached" processor can only handle machine instructions, and all I/O is left to the host.

The unit is interesting in this area, only in that it provides a bridge between single-processor systems and full multiprocessors, which could be of interest to users who are compute-bound in their operations with no additional need for I/O ports.

But even though the 168 APS announcement is a disappointment to those who expected a new processor (called something like the 178) employing a new or modified architecture, its announcement does not mean IBM is not still planning such a system in the future.

It does however, reduce the chances that IBM will have a new processor or series of processors in the near future.

370/155 Performance Upped by University

(Continued from Page 31)

Secondly, the PSE has a memory reconfiguration feature. If there is a power fadeout on one board, the university can reconfigure the memory and bury the defective part off-line.

This lets the 155 run at reduced performance and allows the college to defer maintenance until a more convenient time, Lynn said.

The 155 supports all the educational, administrative and research activities at the school and is also used by various groups in the Houston community.

The system is operating in both batch and teleprocessing modes under OS/VS2, Release 1.7 (SVS) and currently has 2M bytes of EMM memory.

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Despite Doubled Workload

Use of Graphic Input Device Lets Firm Reduce Staff

HARTFORD, Conn. — Phoenix Mutual Life Insurance Co. has replaced the keypunch with the Graf/Pen from Science Accessories Corp. as the method of data entry in its rapidly growing bids and proposals division.

Since 1973 the Phoenix Mutual bids and proposals case load has almost doubled. But, during this same period, the technical staff has actually been reduced.

The Graf/Pen is a direct entry system that can transform curves, lines or irregular objects to digital form at normal tracing speed.

But — most important to the DP people at Phoenix Mutual — the Graf/Pen also has an alphanumeric capability.

Specific meanings can be assigned to specific points on a tablet or working surface, through the medium of a special printed form or "menu."

Each time the Graf/Pen is touched to a certain point or symbol, the meaning assigned to that symbol is recreated through programming or read-only memory (ROM) techniques.

The operator, in other words, needs only to touch a number of a letter to have a specific piece of information entered into the data stream. It is this alphanumeric capability that influenced Phoenix Mutual to replace its temporary keyboard system with the Graf/Pen, a company spokesman said.

Theodore T. Tansi, vice-president of DP, explained the move to the device.

"The number of cases handled by our bids and proposals unit has accelerated year by year. So it was either a matter of tailing off in service or continually staffing up. Or, as it turned out, of finding some way of streamlining our data entry techniques.

"In 1973 — before the Graf/Pen — we processed roughly 4,700 bids and proposals with a technical staff of seven and four keypunch operators.

"In 1974, after we brought in the device, we handled over 7,700 bids and proposals with a staff of only six technical people and three operators. In the first half of 1975 we processed over 4,300 cases with the same personnel," he said.

In the group actuarial department, the firm had never intended to stay with keypunch, Janette Raffino, director of group actuarial, said. Keypunch was merely used for interim processing between the time the unit first computerized in late 1971 and the adoption of the Graf/Pen system.



Operator enters data with Graf/Pen.

"The Graf/Pen is just naturally faster," Raffino said. It is used as an ordinary ballpoint, and, as a matter of fact can be used to make additional marks or notes whenever necessary. This does away with the time required to shift hands and pick up a pen or pencil, she said.

"On top of that, fewer Graf/Pen marks are required to communicate the same amount of information," she added.

"But the main slowdown in keypunch is the preparation of material. The information must be prepared by a first operator. Then verified by a second. And then entered by a third.

"With Graf/Pen one operator does the entry working from original material, thus eliminating two people, two preparation steps and reducing the possibility of error," she said.

The data input unit of Phoenix Mutual's bids and proposals department comprises six Graf/Pen stations. Normally only three or four of the stations are in operation with the other on standby for emergency or supplementary service.

Data is fed from the stations onto magnetic tape which is picked up for entry into the computer twice daily. Tapes picked up in the morning normally return as printouts in the afternoon.

Expansion of its present Graf/Pen facility would be a relatively simple matter, Phoenix Mutual said. Currently each station feeds into the tape drive through a multiplex unit that can support up to 14 stations.

Printed Forms Guide Operator

A set of printed forms that guide the operator during data entry were developed for the system.

The first form is the "master header" which establishes the case number, firm name and other basic relevant data. Other forms control data entry in the areas of employee record, life insurance, major medical, long-term disability and weekly indemnity.

Training and retraining of operators proved to be no major problem, the firm said. The simplicity of the operation means it is essentially simpler to train an operator than a keypunch operator. A keypunch operator must learn a specialized keyboard and a specialized method of communication. A Graf/Pen operator, on the other hand, merely has to know how to pick up a pen and fill out a form that is essentially in basic English.



Six Graf/Pen operators man their stations at one side of the Phoenix Mutual office. No walls or partitions separate them from the rest of the department, as would be the case with a keypunch operation.



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H316 Mini Drum Memory For Military Applications

ANAHEIM, Calif. – A military drum memory system from Datum, Inc. provides mass storage for airborne, aboardship or other applications using Honeywell Information Systems (HIS) H316 minicomputers, the firm said.

The 300 series fixed-head-per-track drum has a capacity of up to 4.65M bits, with a data rate of 2.5 mHz and a 17-msec average access time, Datum said. Rotational speed is said to be 1,800 revolution/min.

The sealed enclosure withstands 10G shock, 2G vibration, 0° to 55° Centigrade temperature and up to 90% relative humidity, Datum said.

The controller, a separate unit, supplies the interface electronics for the H316, the firm said.

The memory costs "about $30,000" a spokesman said, from the firm at 1363 State College Blvd., Anaheim, Calif. 92806.

HP Has Mass Spectrometer System

PALO ALTO, Calif. – The Hewlett-Packard Co. (HP) 5934A minicomputer-based data system is designed to control scan operations of HP mass spectrometers, according to the firm.

The system also controls disk read/write functions and displays and tabulates data at operator command, according to the firm.

The system consists of an HP 21MX mini with 16K words of semiconductor memory expandable to 32K, read-only memory bootstrap loader that eliminates the need for a paper tape reader, an HP 7900 disk drive and a mass spectrometer interface in a stand-alone cabinet.

The system costs $55,000 and delivery is 90 days from the firm at 1501 Page Mill Road, Palo Alto, Calif. 94304.

BDS Reduces Prices

PALO ALTO, Calif. – BDS Computer Corp. has reduced prices on peripherals used in the BDS-3 system built around the Digital Equipment Corp. PDP-11/03, a spokesman said.

The 9-channel tape drive now costs $9,800, down from $11,000, the firm said. The CRTs now cost $3,600, down from $4,000, and the 16K-word memory that is plug-compatible with the LSI-11 bus costs $1,995 in comparison with $2,300.

The firm can be reached at 260 Sheridan Ave., Palo Alto, Calif. 94306.

Correction

IBM offers a 1,100 line/min printer for the 3/10 and 3/15 [CW, Feb. 23].

Compatible With Novas

DG Unveils 16-Bit Micronova Family

By Esther Surden
Of the CW Staff

NEW YORK – The introduction of the 16-bit Micronova family here last week further extended Data General Corp.'s (DG) offerings at the lower end of its line.

The family has the architecture, performance and software of the company's Nova minicomputer series, a spokesman said, and is compatible with DG's Nova 3 mini introduced last year.

Designed for microprocessor applications, the systems are said to be suited for process control, instrumentation, medical applications and use in distributed processing networks and data communications systems.

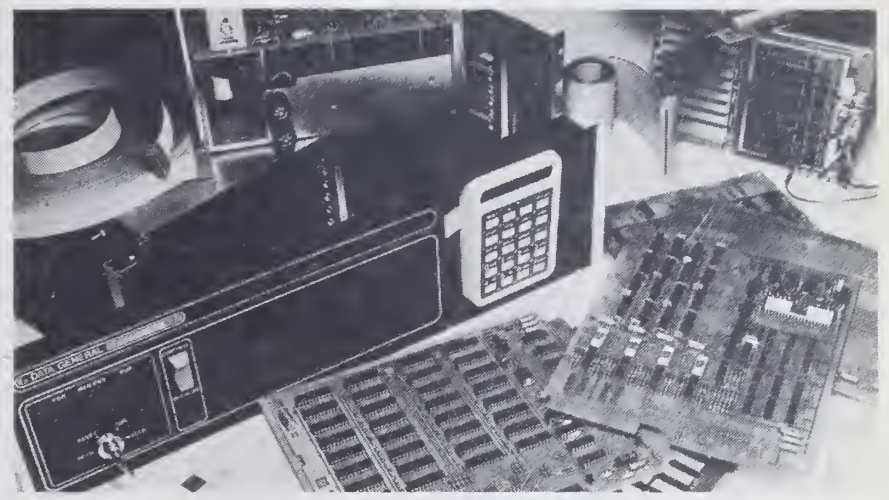
Four basic family configurations make up the line:

- The 40-pin N-channel MOS mN601 CPU chip is the heart of the system and is available alone or with supporting chips. A hardware stack and frame pointer, multiply/divide and real-time clock are CPU features.
- The computer-on-a-board includes the fully buffered CPU with 4K words of random access memory (RAM), backplane-card frame assembly that holds up to nine boards and a power supply. Additional RAM and programmable read only memory (Prom) is available, the firm said.
- Next in the line is a packaged minicomputer in a 9- or 18-slot chassis, with room for up to 32K words of memory and peripheral device controllers. The mini features DMA data channel capability, power fail/auto restart, multiply/divide and a real-time clock mounted on a chassis, the firm said.
- The Micronova development system includes a diskette subsystem and calculator-sized hand-held programmer's console. Micronova development software is included at no charge with a development system that includes an Ascii terminal system, a spokesman said.

"The Micronova is code-compatible with DG's Nova minicomputer family and is supported by Nova software," a spokesman said. It supports Fortran IV and runs under the Rtos and DOS operating systems. It uses utilities and libraries developed for Nova minis, the firm said.

The main memory is available as dynamic RAM or programmable read-only memory for nonvolatile storage of programs, the company said. The RAM is a 4K DG-produced chip announced for use with the Nova 3 computers. Memory cycle time is 960 nsec.

A 40-pin intelligent input/output controller (IOC) at each device interface accepts signals from the CPU and routes them into a parallel 16-line bidirectional data bus for I/O operations, the firm said.



The Data General Corp. Micronova board and chassis packaging are modularly designed.

The IOC can address up to 61 devices and features a program I/O facility with six I/O commands per device.

For data communications applications, the family allows users to implement an entire network with compatible components, a spokesman said.

The asynchronous interface board connects local or remote terminal printers and CRTs to the I/O bus. The board features jumper-selectable device codes, multiple bit/sec rates, EIA RS-232 and 20-Ma interfaces, variable character lengths and full modem control.

A data channel controller interfaces DG's diskette subsystem to the CPU.

The Micronova mN601 CPU costs $225 in single unit quantities and $95 for 500 units and over. The single-board microcomputer with 4K words of MOS memory costs $950 in single units. The minicomputer with a 9-slot chassis, CPU with 4K words of memory, operator panel and power supply costs $1,995.

A development system with an 18-slot chassis, 16K-word CPU, automatic program load, battery backup, hand-held programmer's console, dual diskette system with two 315K-byte drives and the Teletype Model 33 ASR costs $12,265, a spokesman said from the firm at Southboro, Mass. 01772.

MOS Memory, 11/40 Performance Offered With DEC PDP-11/34

MAYNARD, Mass. – The PDP-11/34 processor from Digital Equipment Corp. features MOS parity memory and offers performance equivalent to the firm's PDP-11/40 with a reduction in price, a spokesman said.

The price reduction is made possible by higher density technology, DEC said.

The firm also introduced the PDP-11T34 standard system configuration, which includes the CPU with 32K words of parity memory, memory management, bootstrap loader and clock; a dual-drive disk-pack subsystem; and a dot-matrix printer with controller.

The PDP-11T35 runs under the RT-11, RSX-11M, Mumps and RSTS/E operating systems, a DEC spokesman said.

The PDP-11/34 is said to be both hardware- and software-compatible with the company's PDP-11/04 mini and uses the same memories, peripherals and options.

Up to 64K words of 16-bit parity MOS memory can be added to the processor, with up to 128K words available in a larger than normal chassis. Parity core memory is also available, DEC said.

The virtual console, a built-in emulator that eliminates the need for conventional console lights and switches, is a standard 11/34 feature, DEC said.

The PDP-11/34 CPU with 32K words of memory costs $9,290 a DEC spokesman said. The standard system, including the CPU and memory, dual-drive disk pack subsystem and printer costs $30,900.

An equivalent 11/40 CPU with 16K of core memory in a 10-1/2-inch box and including an extended instruction set and memory management would cost about $17,035, a DEC spokesman said from Maynard, Mass. 01754.

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Improves Control, Reduces Waste

'Prism' Keeps Eye on Optical Laboratory's Operations

PORTLAND, Ore. – A minicomputer system in an optical laboratory here is helping improve management control, reduce waste and increase productivity, according to the user.

The Hewlett-Packard (HP) M260 data base management system is handling inventory, fabrication, accounting and management support for C-B Laboratories, Inc.

The Prescription and Inventory Systems Management (Prism) configuration was designed for C-B by Computer Management Services, Inc. (CMSI), a Portland-based DP service company.

The laboratory considered many systems before it acquired Prism, including a central order-processing system and one from Supreme Optical, a specialty house, according to George Weber, general manager of the firm.

Most of the systems didn't have on-line inventory control capabilities or weren't sophisticated enough for C-B's needs, he added.

The mini system checks prescriptions for errors and omissions, confirms lens and frame inventory and produces exact lens calculations for use by the lens grinders and finishers, he explained.

Prism also includes a management support system for inventory, ordering additional styles and types of lenses and frames. It bills the customer, checks credit and produces daily, weekly and longer period analyses of inventory, sales and accounts receivable, he said.

In addition, the system performs scientific and mathematical calculations and analyses. Using the results, the mini simulates the compound lens and frame curvatures, determines optimum designs, makes cosmetic lens-balancing considerations and verifies that governmental thickness regulations are met.

Hardware for the system, which has been running for nearly a year, includes a 32K HP 2100 CPU, a 10M-byte disk subsystem, four CRTs, a General Electric Terminet 30 printer and one magnetic tape drive. The system uses Image/2000 data base operating system software.

The laboratory is leasing the hardware and software on a five-year lease plan which includes maintenance for about $6,500/mo, according to a CMSI spokesman.

The Prism system, which took three years to develop, begins with the arrival of the eyeware prescription at the laboratory. A clerk enters the data from the prescription into the computer, using a keyboard/display terminal.

The information entered includes frame style desired or furnished; lens magnification power; pupillary distance; lens type and appropriate measurements if for bifocals; lens tints; thickness if other than standard (such as industrial); prism corrections; chemical or heat treatment for toughening; antiglare coating; and other prescription and style data.

At this point, the system identifies, for the operator, missing, inconsistent or incorrect information. If the form projected on the video screen has not been completed or if, for example, the power indicated is not a standard one or the frame indicated is not available in the desired color, error messages appear on the screen.

In this way, the operator can verify the data entered, catching most errors and omissions and resolving them before the production of the eyeware begins, Weber said.

When the job is entered, the system indicates whether the particular account is in good standing and then retrieves the frame dimensions from the frame information file in the computer's disk memroy and specifies a finished lens blank from inventory that meets the prescription requirements and fits the frame.

The system also matches lens base curves for two-eye prescriptions, specifies frame components, case and other accessories and indicates the lens grind and surface finishing processes to be performed by the technicians.

The prices for each service and part necessary are indicated on a printout of all job information on a work order/invoice form.

The inventory is also decreased by the amounts of parts selected for the job, updating accounting, sales and production records as well.

Should a frame part or lens be required for the prescription and not be available from inventory, a factory order ticket is automatically printed. At the same time, a doctor's delay notice is printed, indicating that parts are on order.

After all the required inventory items are placed in the work tray, it is sent to the laboratory.

Status Retrieval

Managers can find the status of a given job in seconds using the display terminal, Weber said. The manager is able to query the computer storage using either the doctor's name, account number or job tray number.

During the processing day, the data entry clerk enters such data as cash received on accounts, credit memos and accounting adjustments. Prescription and stock order invoice charges do not need to be entered because the computer posts them after shipment, he noted.

At the end of the business day, daily accounts receivable, transaction journals for cash receipts, adjustments and credit memos, prescription invoices, stock order invoices and other service invoices are printed.

Hopper to Address Users Group Meeting

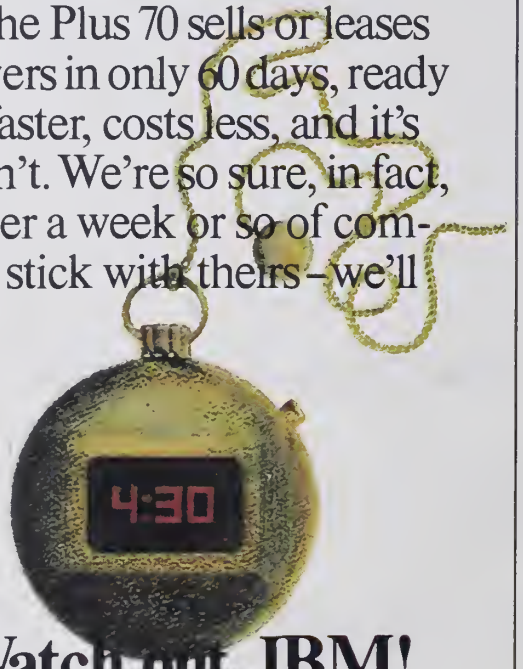
SOUTHBORO, Mass. – Navy Capt. Grace M. Hopper will discuss the future of computer hardware and software in her keynote address to the Data General Corp. User's Group at its annual meeting May 5-7 at the Playboy Resort Hotel at Lake Geneva, Wis. Information is available from the user's group at Southboro, Mass. 01772.

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TRIVEX 70

Mini Makes Commissary Accounting More Accurate

DECATUR, Ga. – A small business computer is helping a restaurant chain here by providing up-to-date management information.

The Huddle House, Inc. chain decided to automate its manual system when the firm opened its second commissary in October. The chain has one other commissary, and each one stocks 104 supply items and 96 food items to serve 50 restaurants throughout the south.

"We thought we might have to hire additional personnel to handle the accounting load if we stayed with our old bookkeeping system," Warren D. Filer, comptroller, said.

"Instead, we decided to change from an accounting system which was kept entirely by hand to a computerized system," he continued.

"Time savings, improved accuracy and the ability to make additional use of our accounting information were among the reasons we decided to go with a computerized system. The opening of the second commissary was just the trigger that made us jump one year ahead of schedule on the computer purchase."

The company chose the 16K NCR 399 based on Filer's previous experiences with NCR products. The system cost about $21,500, Filer said.

The firm keeps separate accounts-receivable and accounts-payable books for its commissary subsidiary. A master inventory file, price list updates, delinquency account reports and posting of daily profits also are on-line for both commissaries.

"Our biggest problem before we acquired the mini was trying to keep perpetual inventory records," Filer added. "Hand pricing each item was time-consuming, too, and there were a lot of small errors. That's why our commissary bookkeeping was the first to be put on the computer."

An NCR systems analyst wrote and tested the programs for the commissary subsidiary and then trained one of the company's bookkeepers as the key operator.

At first the employees were afraid that somehow they would "foul up" the equipment, but soon they learned to operate it, Filer said.

During the first three weeks of training and orientation, the bookkeepers continued to keep parallel hand-accounting records for the commissary operations. The mini revealed a variety of small errors in the parallel books which kept hand-logged accounts continually out-of-balance, the user said. Though such mistakes were always found in the old system, the time-consuming process often put the accounting department behind in other work.

Under the old system, requisitions for supplies or food items went directly to the commissary to be filled. The head of the commissary operation added prices to the requisition to transform it into an invoice. This requisition/invoice was then attached to the order and the package was shipped.

The accounting department didn't see a copy of the requisition/invoice until after the order had been shipped. The prepared invoice was not unit-priced and contained only a total price for supplies, a total for food and a bill total.

The bookkeepers checked the invoice addition. Then, they turned to the requisition/invoice to gather the information needed to update the inventory file – a stack of 200 cards, one for each supply or food item.

"We were always at least one day behind," the bookkeeper said. "Now we're a day ahead. Of course, a number of the old invoices included small errors.

"When we found a billing error, we had to make a notation to correct it on the restaurant's next invoice. Unfortunately, the corrections were sometimes forgotten for several bills.

"With the mini, however, we receive the requisitions and prepare the invoice in the accounting department before the order is shipped. So, the computer-printed invoices are correct from the start."

Another user added that individual prices on the invoice were difficult to verify.

"In truth, we had no way of knowing if the commissary prices we were charging were the most up-to-date prices," she said. "Now price, quantity and item number information are right in the computer memory, so the invoice prices are automatically verified.

"Inventory mistakes were another common problem," she added. Each day it took about 1-1/2 hours to go through the inventory file and update the information item by item."

The mini updates the inventory file as the invoices are being printed, she said.

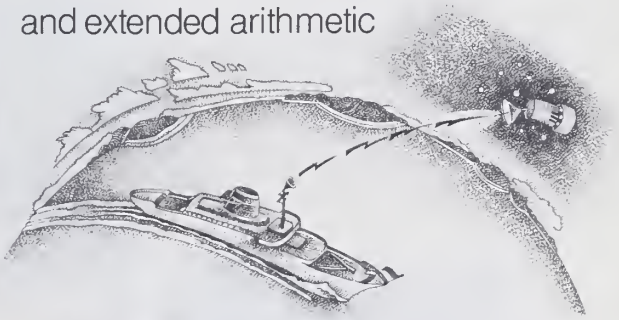
The accounting system also helped the manager of the Atlanta commissary. Because of the many inaccuracies in the old inventory file, Davis had to make weekly inventory shelf checks. After verifying the accuracy of the computer-generated inventory file, the need for shelf checks has been cut back to one or two times per month.

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Trial and Error Leads Firm To Mini For Inventory Control

WAUREGAN, Conn. – A trial-and-error search for an adequate computer system led Field Concrete Pipe Co. here to a minicomputer to handle inventory control and production planning.

The firm acquired its first system in 1970, according to Robert H. Field, president of the firm. It was an IBM 402 alphabetical accounting machine. Although the data obtained from this system was valuable, it was not often available when and where it was needed.

The firm then upgraded to an IBM 3, which Field said the firm "simply outgrew." A larger IBM system was not chosen because of price, he added.

An association of concrete pipe manufacturers sponsored a time-sharing system that the firm decided to try. Since all pipe manufacturers have similar needs and run similar programs, the company felt this would be the answer.

A printer terminal was linked by telephone to the computer in Chicago. The time-sharing system proved too expensive at about $7,000 for one month, and was "too slow," Field said.

Officials at the company determined that the firm needed an in-house minicomputer, capable of supporting a number of video display terminals with instant access to files.

After studying available systems and their capabilities, the company chose a Digital Equipment Corp. Datasystem 340, supplied by Compudata, Inc. of Westport, Conn. The system is PDP-8-based with two interchangeable cartridge magnetic disk storage units, a line printer and four video display terminals. It cost the firm about $41,000, Field said.

Location of Terminals

One of the four terminals is located in the president's office. The other three are situated in the open office area – one at the dispatcher's post, another in the accounting area and the last, generally available to the rest of the office staff and salesmen, is a local or console terminal next to the central processor.

The terminal at the dispatcher's station aids him in authorizing deliveries and handling customer requests and questions and with delivery and sales order information. The dispatcher must know inventory, production planning, shipping schedules and customer credit and payments. With the mini, he has access to that information.

Instead of designating customers by number, the Field company uses the first seven letters of the customer's last name. With a nucleus of some 200 customers, this is easier for all concerned than filing customers by number, Field said.

To access the computer, the dispatcher or other operator keys in the letters. He then receives general and financial customer files on his screen. By adding another letter, the operator may select from a number of options from customer credit to receivables.

If the operator needs further data, the terminal's split screen permits the original information on the customer to remain intact at the top of the screen while the new information is displayed below.

Micro From Heurikon Designed for OEMs

MADISON, Wis. – The MLP-8080 processor from Heurikon Corp. is a microprocessor on a single printed circuit card and is designed for OEM use in control, data acquisition and data processing systems, the firm said.

The 8-1/2-in. by 10-1/2-in. card contains space for 2K words of random-access memory (RAM) and 2K words of programmable read-only memory (Prom). The system can address up to 65K words, Heurikon said.

Other features include a synchronous serial receiver and transmitter for communications with Teletypes and CRT terminal systems. The on-card clock allows transmission rates between 110 bit/sec and 9,600 bit/sec.

Two interfaces, a 20MA current loop and an RS-232C, are available. The micro also has an eight-level vectored priority interrupt system and logic for direct memory access channel control.

The basic microprocessor costs $355; the asynchronous communications interface can be added for $45; 2K of RAM costs $94; and 2K of Prom costs $374 from the firm at 700 W. Badger Rd., Madison, Wis. 53713.

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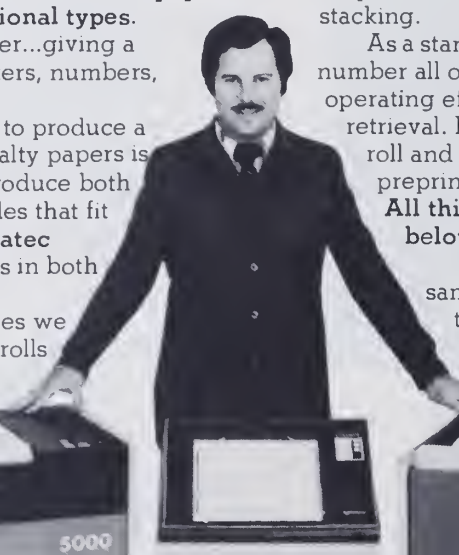
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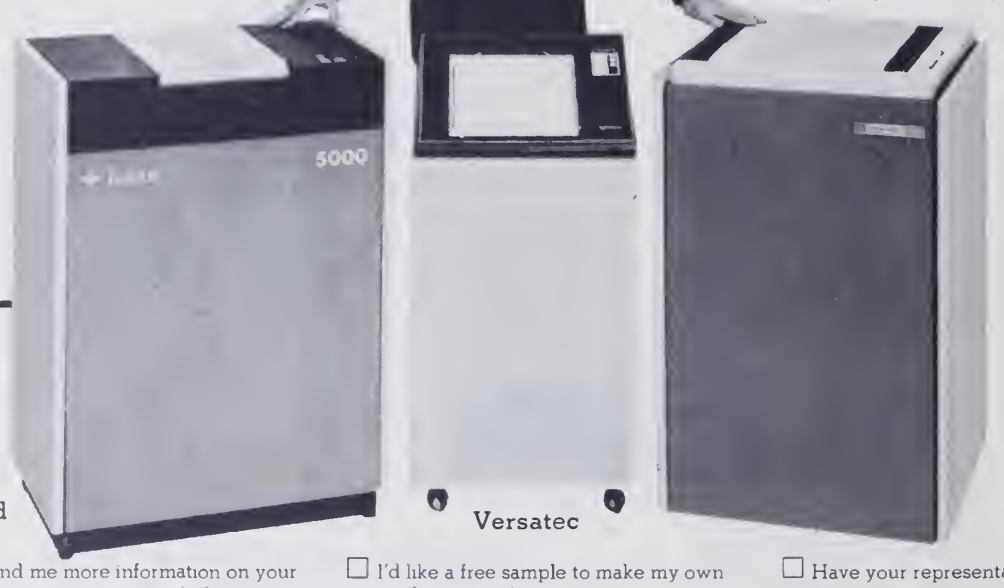
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For Apparel Manufacturer

Turnkey Answer to Rising Service Costs

By Esther Surden
Of the CW Staff

NEW YORK – A clothing manufacturer here switched to an in-house turnkey system when service bureau costs rose to what it said were more than it could afford.

"The cost should have remained fairly constant, but it was being increased continously," according to Morty Abels, president of Morty Abels, Inc., a manufacturer of boys' shirts.

"We had to cut back our processing to twice a week, but even then our costs were excessive," he recalled.

Abels felt the service bureau was charging for time not actually used by the manufacturer and, when prices continued to rise, he began looking at in-house systems.

The firm considered minicomputers from Cascade Data Systems, Basic Four Corp. and Ultimacc Systems, Inc., now STC Systems.

Two Considerations

"The two things that were important to us were the quality of the people who made the presentation and who were going to be working with me in programming and planning and, secondly, that the company supply both the hardware and the software," Abels said.

The people from Ultimacc who made the presentations spoke in the language of the business Abels understood, not in computer jargon, he said. The other firms would only assume responsibility for the hardware and wanted to farm out the software.

"I could anticipate problems that could develop while being shuffled between the vendors," he added.

Brought in Consultant

"Since I didn't consider myself qualified to evaluate the proposals, I brought in someone who could," Abels connued.

He hired a consultant, recommended to him by a close friend who had used the specialist and was satisfied, and he came up with the same answer – the Ultimacc system, Abels said.

"All the figures were in the same ball park, give or take a few thousand dollars," he explained, so money was not the prime consideration when making the choice – the people and software support were.

The Ultimacc system installed at the company includes a CPU, three CRT/keyboard workstations, a line printer and disk storage of 15M characters. It cost the firm about $100,000 when purchased two years ago.

Additional functions have been added, but the cost has been "nominal," Abels said.

Fully operational programs include all of those usually associated with order entry in the apparel industry, except for allocations.

All work stations can operate simultaneously on the same tasks or on different ones. Every member of the staff can utilize the terminals for data entry or file inquiry, he said.

Reports are produced to cover bookings, production planning and control, sales analyses, merchandising and inventory status.

Orders for immediate shipment are processed through the mini on the day received, shipped the next and invoiced one day later. Invoices are mailed daily, cash flow has improved and the workload is evenly divided throughout the work week, a spokesman said.

With the service bureau the firm only received shipping orders on Mondays and Wednesdays. If a customer called on a Wednesday for an "at once" shipment, the shipping order didn't arrive until the following Monday, the company said.

Training of people to run the system has been relatively simple, Abels said. The systems house brought in instructors to teach the employees.

The mini has been reliable, and maintenance response time is fast, he added. Much of the "repair" work has actually taken place over the phone, he said.

ICS Courses Centered on Micros Planned to Run From March to May

CULVER CITY, Calif. – A series of intensive short courses covering a range of topics on microcomputers will be given in eight cities from March to May, according to Integrated Computer Systems, Inc. (ICS).

The courses include "A Manager-Level Overview of Microcomputers" and "Microcomputers/Microprocessors: A Technical Introduction and Survey." Each will run for one day and cost $220.

"Bit Slice Microprocessors, Microprogramming and PLAs" and "Military/Aerospace Microcomputer Systems" will run for two days and cost $395 each.

The courses will be given in Boston, New York, Dallas, Washington, D.C., Chicago, Los Angeles, San Diego and San Francisco.

Further information is available from ICS at P.O. Box 2368, Culver City, Calif. 90230.

IEEE Two-Day Tutorial To Focus on Micros

NEW YORK – A two-day tutorial on microprocessors will be given by the Institute of Electrical and Electronics Engineers, Inc. (IEEE) in April and May in East Lansing, Mich., and Minneapolis, Minn.

The course will be offered April 30-May 1 in East Lansing and May 7-8 in Minneapolis. The course is aimed at senior technicians, engineers and engineering management involved in logic and digital design, IEEE said.

The course will include a survey of microcomputer families, comparing their performance and abilities to perform simple data manipulation tasks, a spokesman said.

The fee is $105 for IEEE members, $125 for nonmembers and $50 for students.

Information is available from the Educational Registrar, IEEE, 445 Hoes Lane, Piscataway, N.J. 08854.

E&L Cuts MD-1 Price

DERBY, Conn. – E&L Instruments, Inc. has cut the price of its MD-1 microprocessor from $1,695 to $1,395, the firm said.

The MD-1 includes a CPU and interface control built around the Intel 8080 micorporcessor chip, a 3K-word memory card of read/write memory and a front panel.

An asynchronous interface board is included, the firm said from 61 First St., Derby, Conn. 06418.

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Opening Soon–New York and Houston

Honeywell System Provides Diagnoses, Monitors Patients

DENVER – The Medical Display Analysis and Recording System from Honeywell, Inc. is a microprocessor-based medical system designed for use in cardiovascular diagnosis.

The system has push-button controls, a combination strip chart and page-copy recorder and a six-channel display that allows data to be presented and visualized in a variety of user-constructed formats, the firm said.

The microprocessor permits storage of up to eight different system setups for clinical procedures.

Prices for the system range from about $25,000 (without the microprocessor) to about $40,000, according to a Honeywell spokesman from the Test Instruments Division at P.O. Box 5227, 4800 E. Dry Creek Road, Denver, Colo. 80217.

EMM Unit Bows

HAWTHORNE, Calif. – The Electronic Memories & Magnetics Corp. (EMM) System 80 offers up to four times the speed of microcomputers based on 8080-compatible microprocessors, according to the firm.

The micro consists of an asynchronous bipolar CPU with 16K-byte memory, 450 nsec cycle time, direct memory access, read-only memory, bootstrap loader, RS-232C interface, operator panel and a 5-slot chassis.

The system is also available in a 650-nsec core memory version and a high-speed NMOS version with 180 nsec NMOS version.

The core memory System 80 costs $4,150 for 16K bytes of memory; the 18-nsec model costs $4,200 for the same amount of memory; the regular 450-nsec version costs $4,500 for 32K bytes. EMM is at 12621 Chaldron Ave., Hawthorne, Calif. 90250.

Motorola MPA-1 Tests, Debugs Micro Hardware and Programs

CAROL STREAM, Ill. – The MPA-1 microprocessor analyzer from Motorola Data Products is a digital diagnostic instrument for testing and debugging microprocessor hardware and software.

The unit is designed to provide a "window" into actual microprocessor operation, Motorola said. The MPA-1 captures 32-word segments of program execution and displays the information on a 9-inch CRT.

Words are displayed in hexadecimal to allow direct comparison with written program instructions, without the need for manual binary-to-hexadecimal translation, the firm added.

Individual probe buffers interface the unit to Intel, Texas Instruments, Rockwell, MOS Technology, Synertek and Motorola microprocessors, Motorola said.

The MPA-1 package with three probe connectors and one probe buffer costs $2,985. Additional probe buffers cost $100 each from 455 East North Ave., Carol Stream, Ill. 60187.

PCM 12-Bit Device Software-Compatible With DEC PDP-8 Mini

SAN RAMON, Calif. – PCM has a 12-bit microcomputer said to be software-compatible with the Digital Equipment Corp. PDP-8 minicomputer.

The completed kit can execute nearly all PDP-8 software, including assemblers, editors, debug routines, advanced languages like Basic and Fortran and DEC's OS-8 operating system, the firm said.

The PCM-12 uses bus-oriented architecture. The 80-line bus accommodates up to 15 cards for device interfaces and additional memory.

The unit includes one 4K-word memory card and is expandable to 32K words, PCM said.

The kit contains CPU, control panel, 4K words of static memory, cabinet and power supply and costs $799. Teletypewriter, cassette recorder and other interfacing modules are available from the firm at P.O. Box 215, San Ramon, Calif. 94583.

Micro Products

Circuit Available For Less Than $10

SANTA CLARA, Calif. – An OEM microprocessor circuit called SC/MP is available from National Semiconductor Corp. (NSC) for under $10 in large quantities, the firm said.

The unit has all the hardware needed to perform controller and switching functions where processing speed is not a critical factor, according to the firm.

The 8-bit SC/MP is designed to fit applications in which 4-bit processors are too difficult to use and for which most available 8-bit units are too powerful and expensive, NSC said.

To make a complete stand-alone micro, the user must add random-access memory, read-only memory, power supply and console, the firm said.

The firm can be reached at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Applications Described In Manual From Motorola

NEW YORK – Applications information for a representative general-purpose microprocessing unit is provided in the *Microprocessor Applications Manual* from McGraw-Hill Book Co.

Prepared by Motorola Semiconductor Products, Inc., the 716-page hard-back volume includes architectural descriptions of the Motorola MC 6800 family of products, the firm said.

Programming techniques are also examined in the volume, as well as interrupt structure, I/O devices used with the system, and auxiliary circuitry.

The book uses diagrams, photographs, charts and tables extensively throughout and costs $25 from the firm at 1221 Avenue of the Americas, New York, N.Y. 10020.

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COMPUTER INDUSTRY

CI Notes

Burroughs' Venture Plans High-Speed Matrix Printer

MELBOURNE, Fla. – Burroughs Corp. has formed a joint venture firm that plans to introduce a high-speed dot matrix impact printer.

The firm, Florida Data Corp. (FDC), was formed with Optical Business Machines, Inc. (OBM), which has been developing the printer.

Burroughs already makes matrix printers, but of a slower speed, a spokesman said.

The president and executive vice-president of FDC hold similar positions at OBM. Burroughs will have two men on the FDC board of directors.

Details of the financial arrangement were not disclosed.

DG, Incoterm End Merger Talks

SOUTHBORO, Mass. – Data General Corp. (DG) and Incoterm Corp. have terminated discussions regarding the acquisition by DG of Incoterm.

DG officials gave no reason for the move.

DEC Buys More Memorex Drives

SANTA CLARA, Calif. – Memorex Corp. has received a $2.5 million follow-on contract from Digital Equipment Corp. for 100M- and 200M-byte disk drives. Delivery is scheduled to begin in the second quarter.

Memorex previously received an award for $1.9 million in drives from DEC.

Singer Takes Pitch to Honeywell

MINNEAPOLIS – Singer Co. gave Honeywell, Inc. a presentation about the business machines operations it is trying to sell, but thus far there aren't any negotiations, a Honeywell spokesman said.

Supershorts

Mini-Computer Systems, Inc. has formed an international subsidiary, MCS International, to develop additional markets for its Micos system.

– – –

AMS Systems, Inc. has shipped its 1,000th IBM-compatible main memory system, bringing its installed semiconductor memory base to over 600M bytes, the firm said.

– – –

The Italian and West German arms of Data Logic will be the exclusive distributors in those countries of Identicon Corp.'s bar-code scanning equipment and systems.

At Senate Hearing

Adapso Opposes Banks in DP Services

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. – National banks should be allowed to offer DP services only under conditions of "maximum separation" between the units offering DP services and other banking services, the Association of Data Processing Service Organizations (Adapso) told a recent Senate committee hearing.

The organization also asked Congress to clearly invest one federal agency with the power to apply any such legislation.

These were two of the teeth Adapso told the Committee on Banking, Housing and Urban Affairs it would like to see put in the Competition in Banking Act of 1975 (S. 2721), which it supports.

S. 2721 is an amendment to the Bank Holding Company Act and Bank Merger Act.

In the long run, Adapso has a fully developed electronic funds transfer system (EFTS) in mind, according to Bernard Goldstein, director and past president of the association and vice-president of Tymshare, Inc.

He presented to Sen. William Proxmire (D-Wis.) and his committee Adapso position papers which argued the marketing of DP services by banks effectively destroys competition in the computer services industry and could eventually create "an improperly designed EFTS" by excluding non-bank-affiliated DP services organizations.

For 10 years Adapso has attempted to obtain protection against unfair competition from banks through public information, the Comptroller of the Currency, in the courts and before the Federal Reserve Board (FRB), Goldstein said. He outlined for the committee the concerns of the association's 283 company members, which he characterized as "the major suppliers of computer services in this country."

Adapso is and has been worried about "the dangers of the spillover of market power from other lines of commerce" to that of the DP services industry, he told the committee.

In particular, he cited "incremental marketing" by banks – "the use of so-called excess computer capacity employed in one line of commerce to market computer services in a second line."

While recognizing the public could benefit from a lowering of prices for computer services if banks operate them as a sideline, Goldstein said a "tying effect" could also result in which normal banking services would be used to convince customers to use the bank's computer services as well.

It is this tying effect which the association regards "as frequently unlawful and always improper and unfair," he said.

In difficult economic times, the risks of tying and the tying effect are substantial in banking and finance, he added, noting no coercion is necessarily involved.

"Rather, the borrower, recognizing the bank's discretion and eonomic power, is tempted voluntarily to patronize bank-affiliated enterprises in the hope of improving his chances to obtain it on favorable terms," Goldstein noted.

The association suggested congress permit the tying effect only in those instances where there is some benefit to the public – whether economic or social.

Where there are no such benefits, however, the two lines of commerce should be kept independent of each other, Goldstein said.

Maximum Separation

He called this the principle of maximum separation and suggested it was first applied in the computer industry with the 1956 Consent Decree against IBM, in which that corporation's service division was split from the rest of its operations.

"In banking, for example, this would mean that a bank's computer services offering would be divorced from its credit operations by using separate and distinct company names, different personnel, separate equipment, operating in a different territory and as much else as would ensure that the customer went where he went because of the product and not the parent," he told the committee.

The bill being proposed by Proxmire would generally restrict the activities in which registered bank holding companies may engage. It would also control the acquisition of banks by bank holding companies and other banks, the Adapso representative noted.

The association hopes the proposed legislation will result in much less marketing of DP services by banks and in the application of the maximum separation concept "so that bankers could market

(Continued on Page 46)

GSA Extends Pact With Infonet; Outlines New Plan for Bidding

By Nancy French
Of the CW Staff

WASHINGTON, D.C. – The General Services Administration (GSA) has released its plan for soliciting teleprocessing service contracts from all interested vendors but, at the same time, extended its existing sole-source contract with Computer Sciences Corp.'s Infonet Division for 15 to 27 months.

The plan, announced barely two weeks ago, has been greeted with mutterings and skepticism by other teleprocessing service vendors who had expected to get an even chance when GSA announced its plan to end Infonet's sole-source contract last summer [CW, July 30].

Infonet competitors now see little opportunity of getting a wedge into the government market now estimated at worth up to $80 million.

Under the new plan, GSA will release requests for proposals (RFPs) by April to solicit bids from teleprocessing service vendors for use in compiling a catalog of "GSA-approved" potential suppliers.

Federal users would then be able to select from the list the vendor offering the type of service that most closely matches their needs and make their own arrangements with no additional GSA intervention.

However, those users also could opt to use the Infonet contract instead, other vendors said.

Although GSA contends that new users would not be permitted to buy off the Infonet contract, the Infonet contract extension said any government agency with "a valid purchase order as of June 30, 1976" is in effect a current user. These "current users" would be permitted to add to existing data bases or even add programs that are dependent on systems or data bases already in existence during fiscal 1976 under the Infonet contract.

"Infonet will continue to dominate the market, and GSA has thrown the rest of us a bone," vendors charged at the Federal DP Expo 76 show here recently.

Further, they complained, in submitting their RFPs, other teleprocessing service vendors will be quoting on an unknown quantity of business.

Infonet, on the other hand, will already have a base of business worth more than $30 million, giving that firm the opportunity to offer much more attractive discounts and garner the lion's share of government business.

The original plan called for multiple contracts without the Infonet sole-source contract as an alternative.

Theodore Puckorius, commissioner of GSA's Automated Data and Telecommunications Service, said the Infonet contract is being extended to provide "technical continuity" for existing Infonet us-

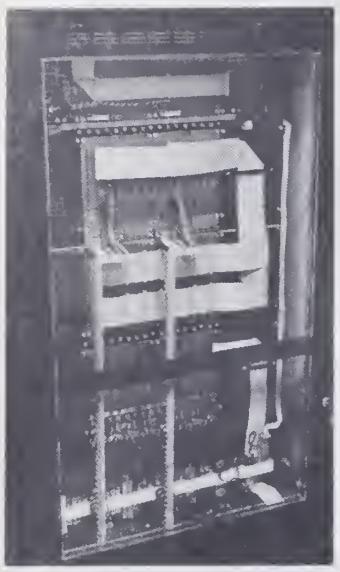
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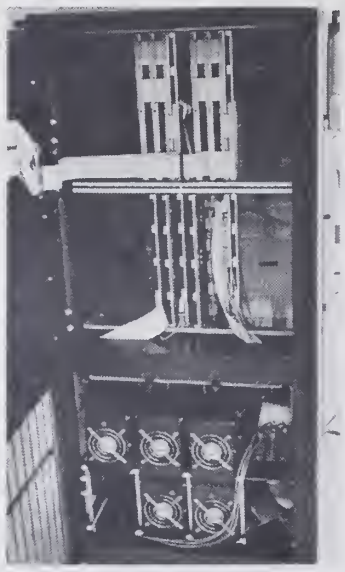
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Front view of the Tandem 16 shows two processors, each with 256K memory, on top shelf and I/O controllers on bottom.



Tandem 16 rear view shows inner processor, communications, power distribution and switching gear.

Orders for Tandem 16 Ahead of Plan

By Molly Upton
Of the CW Staff

CUPERTINO, Calif. – Orders for Tandem Computers, Inc.'s Tandem 16 Nonstop system [CW, Dec. 10] are ahead of plan, according to Jim Treybig, president of the firm.

First customer delivery is still targeted for April, he noted. The planning phase has been completed and the firm is currently devoting time to product testing.

The production phase for the modular, multiprocessor system designed to support as many as 1,000 terminals without interruption is about to start up, he added.

Treybig said Tandem's biggest problem in winning customers is that it is a new company. There is no question about the product, he said, adding Tandem has defined its market area as large firms.

Prospective customers have to believe in a firm's product, management team and financial backing in that order, he said.

Tandem lets its prospective customers "meet us and judge us as people," he said.

If a customer has a clear need for a product offered by a startup company, it is a lot more likely to buy from a new company than a customer whose need is not so great, he said.

Regarding financing, Treybig said "I don't believe you'll see a better financed startup." The firm is backed by five venture-capital outfits.

The key is to put enough money into a venture, but not so much that it dilutes the return to the investors, he said.

Tandem's development team is moving on to other things in areas such as communications, data management, CPU, peripherals and languages, Treybid said.

The firm is running a five-month training course for servicemen and analysts in each sales location, along with a demonstration unit and spares, he said.

"You have to do it right" in order to be considered by customers, he said, and big firms are not as apt to buy if local service is not available.

Having analysts in the field will also help the firm keep its technical talent at home, he said, rather than putting out fires in the field. Technical support will be provided from home as needed, he added.



CW Photos by M. Upton

Jim Treybig

In addition, Tandem is negotiating with third-party service organizations to handle terminals, he said.

Tandem currently has about 60 employees, including those in the field.

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Drive Moves Emerson Into Mini OEM Arena

By Esther Surden
Of the CW Staff

SANTA ANA, Calif. – Moving out of the military and industrial market and trying to capture some of the traditional minicomputer peripherals trade, Emerson Electric Co. is marketing a 1/2-in. tape drive system.

The system fits what Emerson terms the "hole in the market" between the storage capacity of the 3M disk and that of a fixed disk. The unit also offers an "alternative to the individual who has outgrown a single peripheral and asks 'What should I do?'" Ron Carroll, marketing manager for OEM sales, said.

Emerson is giving the customer a "unit comparable in size and price to a floppy disk, with approximately 50 times more capacity," he added.

The Model 2005 costs $2,295 with OEM discounts available; the Tape Pac costs $70, Carroll said.

"The product is unique in that it has a 3-in. tape path. We don't push or pull the tape directly off the reel for greater reliability and longer tape life," Carroll said.

The unit has four moving parts – the capstans and the roller guides – and is plug-compatible with conventional tape drives so the user does not have to make any modifications, he added.

The firm plans to market the system to OEMs through 12 sales offices throughout the U.S.

A complete product line will develop from this device, Carroll predicted. Interfaces will be available to hook the system to all the major minicomputers on the market by next year, he added.

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Adapso Urges Separation Between Banks, Service Arms

(Continued from Page 43)

only in areas other than their banking area with different facilities, different personnel and the like," he indicated.

"But I hasten to add that we had these same hopes when the bank Holding Company Act was last amended [in 1972]," he added.

"We pointed out to the committees then considering the matter, however, that these were only hopes and that experience taught that regulatory agencies' perceptions all too frequently are the result of the perceptions of those they regulate."

Illustrates Difficulties

To illustrate the difficulties posed by the last attempt to amend the Bank Holding Company Act and to argue for control by one agency over whether a bank should be permitted to offer services outside the normal banking realm, Goldstein related one incident to the committee.

When amended in 1972, the Bank Holding Company Act gave power for the determination of what were "closely related" or "public benefit" services to the FRB.

That agency did apply the principle of maximum separation to the holding companies' offerings of DP and other activities, Goldstein recalled.

"One rejection [by the FRB] was the proposed acquisition of Dial Financial Corp. by Chase Manhattan Corp., a banking holding company," he stated.

"After this experience the Chase Manhattan avoided the FRB, and the application of the Bank Holding Company Act, on its next acquisition.

"It acquired Interactive Data Corp., a computer service company, into a subsidiary, the Chase Manhattan Bank, as opposed to the holding company, after applying to a permissive Office of the Comptroller instead of the FRB," he continued.

Surprised at Loopholes

On hearing this particular story, the senators in attendance at the hearing expressed surprise at the discrepancy between the rulings of the FRB and the Comptroller, indicating the last amendments to the Bank Holding Company Act had been designed to prevent such contradictory actions.

"We weren't even aware that the Comptroller got into the act," one said.

Adapso testified before the committee with other industries made up of small companies confronted with competition from national banks. These included representatives from the Investment Company Institute, Securities Industry Association, the courier and armored car industries, the American Society of Travel Agents and the National Auto Dealers Association, Inc.

French Covering to POS

PARIS – Conversion by French retailers to computerized point-of-sale (POS) systems has picked up speed, according to NCR Corp.

NCR France sold 1,350 Model 255 computer-controlled retail terminals and 70 computers in the last quarter of 1975, four times the number sold during the previous year, the firm said.

Most of the orders for 255s came from "hypermarkets," stores which offer general merchandise and food products under one roof, NCR said.

Navy Gets Univac Memory

WARMINSTER, Pa. – Sperry Univac has delivered a block organized random-access memory (Boram) system test vehicle using MNOS technology to the Naval Air Development Center here.

The delivery to the center for the All-Application Digital Computer program represents one phase of a long-term Navy development program for advanced computer hardware, a Univac spokesman said.

GSA Extends Infonet Contract

(Continued from Page 43)

ers. The contract gives government agencies a volume discount of 45% off Infonet's commercial rates.

Such users will be required to submit a plan for recompeting their teleprocessing requirements by Oct. 1, and new basic agreements will begin to go into effect at that time, Puckorius said.

All types of services, from full service to interactive to remote batch will be covered by the various contracts GSA intends to sign, and vendors providing a variety of geographic coverage from national to regional to local will be included, according to Puckorius.

GSA said it intends to coordinate government interaction with teleprocessing service suppliers by sponsoring interagency user groups and financing some contracts through GSA's DP fund.

The user groups will serve as forums for discussion of service problems, rates, privacy and data security reviews, telecommunications support and other matters of mutual interest, Puckorius said.

Acquisitions

Data Equipment, Inc. has acquired the U.S. manufacturing and marketing rights and most of the assets of **Qualterm, Inc.** and formed a division called Qualterm Terminals under new management.

Universal Information Systems, Inc. has acquired the assets, facilities and personnel of **Microfax, Inc.**, a microfilm services firm.

United Telecommunications, Inc. has acquired **International Timeshare Corp.** (ITS) for an exchange of one share of United Telecommunications' stock for about 6.5 shares of ITS common stock.

Western Peripherals has agreed to acquire the assets of **Kastle Industries** for an undisclosed amount.

Management Assistance, Inc. (MAI) has acquired **Texas Scientific Corp.**, which is operating under the name of Genesis One Products Corp.

Automatic Data Processing, Inc. (ADP) has signed a contract to acquire all of the outstanding stock of the **Delos International Group, Inc.** for over $6 million, a reduction of 25 cents per share from the $5.25 per share agreement. The transaction is subject to approval of Delos stockholders.

ADP has also agreed to acquired 67% of the common stock of **Systems S.A.** of Brazil for an undisclosed amount of cash.

Zytron Data Systems has acquired the rights to the **Microtym** system software and product line from **Tymshare, Inc.**

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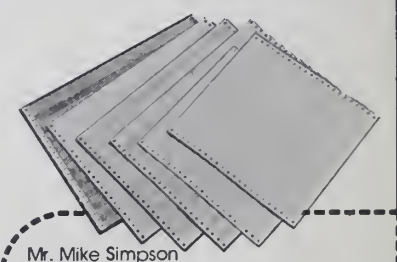
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HP Manager Predicts

Shipments of 3000 to Triple in 1976

By Molly Upton
Of the CW Staff

SANTA CLARA, Calif. - Shipments of the Hewlett-Packard Co. (HP) 3000 in fiscal 1976 will triple those of a year ago, according to Ed McCracken, general manager of HP's General Systems Division.

HP plans to introduce a new member of the 3000 family this year, he said.

The 3000 reached the break-even stage in the fall of 1974, he said, adding, "We plan to be very profitable."

Most of the growth has been in the business application market, he said.

In line with the transmition from scientific customers to business-oriented customers, the firm is increasing the 3000's Cobol capabilities, including routines to optimize Cobol for use in data entry, he said.

McCracken said he sees an interesting transition in that the super minis are becoming more like small business systems with better operating systems, packaging and support, while the small business systems are becoming more like the super minis in their terminal orientation price and purchase strategies, he said.

Out of the two segments of the computing market, the traditional mini and the DP or business or mainframe area, the fastest growing have been the super minis and the small business systems, each growing about 50%/year.

The 3000, he said, fits right in the middle of the small business and supermini machines areas, he said.

HP is selling 3000s to large companies for use in distributed networks and to the second-time user, he said.

The selling cycle for use in a distributed environment is long, but is becoming shorter since IBM is pushing the concept, he said.

A few years ago many were talking about using distributed systems, but few were putting their gut-level business applications on them, he said. Now that is changing.

HP Target User

HP's target in the second-time user area is the IBM 3 user and eventually the 32 user, he said.

The firm has designed training packages, conversion packages, manuals and an Isam simulator to aid the 3 user in the transition, he said.

Most 3 users can convert their critical applications to an HP 3000 in two weeks with one of their people trained by HP, he said.

The major strength of the 3000 is its software, he said, citing the recent popularity of its Image data base system.

More and more of the models 200 and 300 are sold with Image, he said, as customers are specifying the data base package.

The firm has two other models, the 50, which is sold to systems houses for software creation, and the Model 100.

The division also handles the 2000 Access system, which McCracken said can serve as a front end to both IBM 370s and Control Data Corp. machines. The unit also serves as a Hasp workstation.

Over 50% of the units are sold in the education market, but a growing percentage is being sold in the commercial area, he said.

Companies usually have remote batch equipment or terminal concentrators, but few have both, he remarked.

Looking at Office Management

The division is also looking at the area of office management, which McCracken said includes linking up word-processing capabilities along with data base management and remote batch.

HP is also working on standardizing and professionalizing the firm's offerings to customers. McCracken said plans call for a three-volume work on what a customer can expect in terms of machine performance, service, lease and training as well as consulting.

McCracken pondered what constitutes acceptable uptime in a system, commenting on the lack of standards in this area.

His goal for the HP 3000 is one software crash a week, which could be back up within five or 10 minutes with a warm start, and one hardware crash a week.

The 3000 reliability has improved since HP halted shipments in December and also retrofitted the ones in the field, he said, so it is running about 99% uptime.



CW Photo by M. Upton
Ed McCracken

Adapso to Expand Meeting, Seminar Program in 1976

MONTVALE, N.J. – The Association of Data Processing Service Organizations (Adapso) plans to expand its current meeting and seminar program to meet specific member and industry needs.

New seminars scheduled for 1976 include a meeting on "Managing Your Legal Function" Sept. 17-18 in Colorado Springs, Colo., and "Insurance and You" in New York City, Sept. 28-29.

The association will also conduct both a New York financial analysts meeting and a series of regional meetings for the banking and financial community during the year. A facility management conference is scheduled for Dallas on May 11-12.

The Spring Management Conference will take place in Atlanta April 5-7.

Here are some of the companies we'll be keeping at CompDesign 76.

TRI-DATA

The Flexi File 10 with an RS 232 communications interface for data storage and retrieval, transfers information at baud rates up to 9600. It is a low-cost floppy-disk based peripheral that can easily be incorporated into any type data system.

WANG LABORATORIES, INC.

Wang will display for OEMs a fast, quiet, reliable 200 cps printer. With a standard 96 character set formed by a 9 x 9 matrix, up to 132 print positions.
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EMM ELECTRONIC MEMORIES & MAGNETICS CORPORATION

EMM will be introducing its new SYSTEM 80, a high-performance, 8080-compatible. complete micro-computer system. Outstanding features include speeds up to four times faster than typical 8080 systems, choice of both core and semiconductor memory, and extended addressing up to 1 megabyte. A full line of minicomputer add-in/add-on memory and several standard core semiconductor memories will also be on display.

System Industries

We've delivered over 2,000 disk storage systems to mini computer users throughout the world - for a lot of good reasons. System Industries represents your only viable alternative to the mini computer manufacturer when it comes to purchasing disk systems. For details about storage capacities (up to 1 billion bytes), access time, and our powerful software routines, see us at the CompDesign show.

Diablo
Diablo Systems Incorporated

Diablo's exhibit will feature the new S/400 Disk Drive featuring dual head positioner, inertial actuator, fixed and removable disk, top and front loading, 13.3 to 50 MB capacity. Also featured is new HyTerm, 45 characters per second terminal based on new HyType II printer.

The Other Computer Company:
Honeywell

Honeywell will demonstrate a minicomputer especially suited to the OEM manufacturer and systems builder. The powerful system architecture combines compactness, advanced modularity, built-in test and verification, and exceptional reliability and serviceability. Software, peripherals, communications capability, and an attractive price structure round out an offering that has benefitted from over ten years of extensive minicomputer experience.

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2ND DAY: SOFTWARE 76: Audit Software & Data Security. Data Base Management Packages. Software as a Measurement Tool. Packaged Applications.

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70 Lawyer/Accountant
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Thank you, Boston! . . .



The Boston opening of Computer Caravan 76 was a busy scene as more than 3400 people travelled through the snow to see the Forums, seminars and exhibits – a 13% greater attendance than ever before in Boston. This year's show included OEM exhibitors such as Control Logic (see a) and Informer (o) in its new for '76 CompDesign segment. There were Forum sessions for both users and OEM's (b and m) and time for informal business discussions (f). The exhibits enjoyed excellent attendance, and there was a lot to see. In at least one case, a purchase was made on the floor as Dick Bauer, VP of Blue Streak (which does data processing for Blue Cross/Blue Shield) signed a contract with Mike Bozary of Datapoint for two terminals (g). Other products being shown included Honeywell's new Level 6 minicomputer (c); Key Tronic's versatile DATAWAND hand-held OCR System (d); Wang Laboratories' word processing system (e and i) (which received a much better than expected reception); BASF's full line of magnetic media (h); Consolidated Computer's KEY-EDIT 60 key-to-disk system (k); Centronics' medium-speed serial matrix impact printers and teleprinters (l); and a variety of products and services from AT&T, including their Dataphone sets and network services (n).

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COMPUTER CARAVAN 76

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Seven Amdahl 470V/6s Installed; More Expected

By Molly Upton
Of the CW Staff

SUNNYVALE, Calif. – Amdahl Corp. has seven 470V/6s installed and is negotiating with a "significant number of prospects," according to Gene M. White, Amdahl president, who declined to be more specific.

The firm's charter is in the large-scale computer market, he said, adding he sees exceptional growth opportunities in this area.

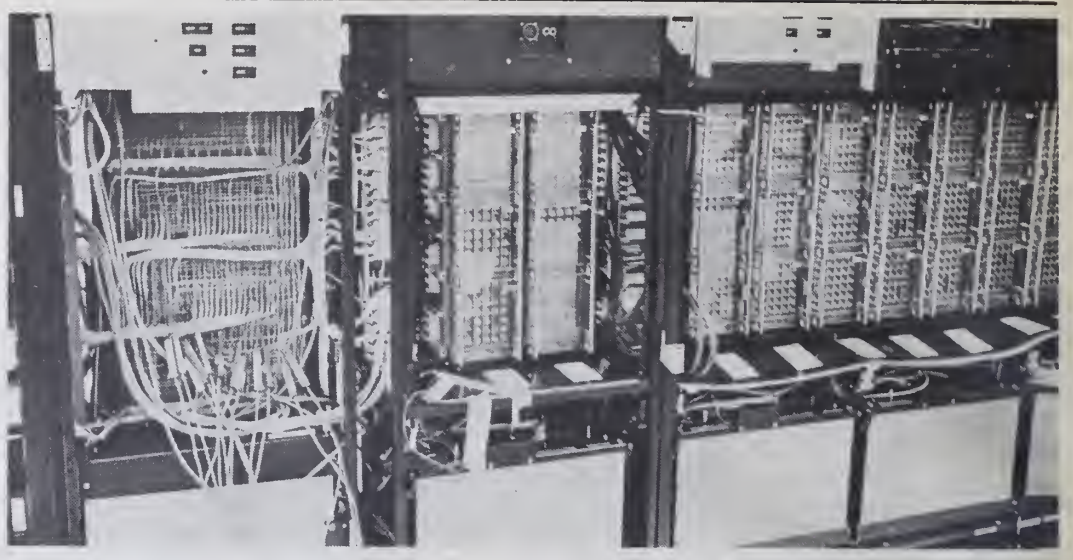
The trend toward distributed processing will increase the demand for large-scale machines, he said.

Amdahl's R&D expenditures are focused on the large-scale computer market. They are relatively unique to that area, and not cost-effective in smaller systems, he said, indicating he does not expect to see any technological spinoffs into the areas of smaller machines or minis.

For one thing, smaller machines don't need the speed, so circuits with less power consumption can be used; in addition, NMOS technology is more suitable than the emitter-coupled logic Amdahl uses.

Amdahl designed masks for its processors when it could not procure LSI components off the shelf from semiconductor manufacturers and few wanted to develop proprietary designs for customers.

Amdahl's principal suppliers are Advanced Memory Systems for memory and Motorola for LSI, White said.



CW Photo by M. Upton

Amdahl 470V/6 interface unit, in "third generation" technology, is on the left, while 16-channel unit and part of the CPU, embodying Amdahl's LSI technology, are on the right.

A unique feature of Amdahl's design, he said, is a heat sink dissipator attached on the top of every LSI chip which allows the system to function without some type of water or freon cooling.

Agreement Confusing

Amdahl's agreement with Fujitsu Corp. is often confused by people, he said. Basically Amdahl retains 100% design control over the 470V/6.

Fujitsu, which owns 23% of Amdahl common stock, is marketing the M190 in Spain and Japan. He termed this machine "functionally the same" in that it and the 470V/6 execute IBM instruction sets.

These machines have some common subsystems, he said. The Fujitsu model uses a different console, he observed.

Fujitsu uses some of its semiconductor components made under license from Amdahl, while Amdahl uses American suppliers' products.

White said Amdahl manufactures some key subsystems which are assembled in Japan. These are then shipped back to Amdahl for final test and system assembly.

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Orders & Installations

Manufacturers Hanover Trust Co. has ordered 10 NCR Century 251 computers and related peripherals to be used in a distributed network to process retail banking applications using a central information reference file supplied by EDP Corp.

Brundage, Story and Rose of New York has installed a Burroughs B700 to prepare appraisals of clients' investment funds.

Dartmouth College has ordered a Honeywell 66/40 computer to accommodate the growth in computing by students, faculty, administration and educational networks.

Hudson Valley Community College in Troy, N.Y., has installed a Burroughs B4700 to support both academic and administrative functions on campus.

The Amphlett Printing Co., publisher of the *San Mateo Times*, has ordered Logicon, Inc.'s Logigraphic prepress automation system and Editorial Management System to automate the editorial process.

The Water Department of the City of Philadelphia has ordered a Hewlett-Packard Model 3000 for its engineering computer center.

The Greyhound Corp. has ordered a message-switching and front-end communication system, Greycom III, from Computer Communications, Inc.

The Simulation Products Division of Singer Corp. has installed Model 7/32 and 8/32 computers from Interdata, Inc. as part of the Orbiter Aeroflight Simulator being built by Singer for the National Aeronautics and Space Administration space shuttle program.

Wachovia Bank of Winston-Salem, N.C. has ordered 40 NCR 770 financial terminals for automated applications.

Wehba's Grand Bazaar of Oklahoma City has installed an IBM 3660 supermarket system consisting of 17 electronic cash registers and an IBM 370/125.

Lamb Distributing Co. of North Carolina has ordered a Burroughs B700.

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Terminal Makers Report Upsurge in Sales

By a CW Staff Writer

WOBURN, Mass. – Terminal makers who exhibited at the Computer Caravan here recently reported an upsurge in business, with more growth expected this year.

Genesis One Corp. has been marketing its IBM 3277-compatible G77 CRT terminal for a little over a year and has about 2,000 installed, according to Michael Brody, vice-president of sales.

The backlog for the G77 is "very healthy," he added.

Although there has been price cutting in this field, Genesis One sells the G77 at listed prices, which are below those of IBM, and "that seems to be enough," Brody said.

The terminal is made through the Genesis One Products Corp., formerly Texas Scientific, he said.

Transition to Intelligence

Beehive Medical Electronics, Inc.'s national sales manager, Frank Richins, predicted a transition toward intelligent terminals as the prices on these units decrease.

Although he still sees a large need for dumb terminals, there will be an evolution toward more capable units, he believes.

Most of Beehive's line is semi-smart, with programmable firmware, but the terminals are not intelligent because they are not programmable through downloading or bootstrapping, he said.

The firm's Superbee is the hottest selling item, he said. He noted the Superbee was the first terminal to incorporate a microprocessor.

There has been a lot of price cutting in the dumb terminal area, Richins observed, but added he doesn't expect to see much erosion during the next year. Prices have "pretty much hit rock bottom," he added.

Beehive has not reduced its prices for about a year, he added.

Most of Beehive's orders are from the OEM sector because the firm lacks a lease plan, he explained. But, he said, Beehive will be going into the end-user market with some products it will announce this year.

At Megadata Computer and Communications Corp., Victor Chelpaty, regional sales manager, said business is good. The firm provides custom-designed intelligent terminals, one of which uses a Sony color TV as a screen.

Delta Data Systems' director of marketing, Paul Freeman, said business for that firm was on target for 1975, which was about a 25% increase over 1974. Business for 1976 is expected to grow about 25% to 30%, he added.

The firm makes intelligent terminals and plans to introduce more in the coming year.

Bomb Causes $75,000 in Damages To HP Integrated Circuits Facility

PALO ALTO, Calif. – Hewlett-Packard Co.'s (HP) integrated circuit laboratory here sustained about $75,000 in damages when a bomb exploded outside the building adjacent to the south wall recently.

The explosion knocked out the wall and also set off two tanks of compressed oxygen and nitrogen, a spokesman said.

The firm had received two telephone calls warning of the bomb and four persons were evacuated from the building. The group issuing the warning called itself the Red Guerrilla Family.

The facility, which is supported by corporate funds, was back in operation last Monday following the bombing the preceding Friday.

An HP spokesman said a day of work was lost but "nothing crucial was destroyed."

Study Covers DP in Cartography

NEWTON, Mass. – A study covering applications of computer-aided cartography by government agencies, utilities, industry and university research centers is being offered by International Technology Marketing.

The study, *Computer Cartography: Worldwide Technology and Markets*, discussed the areas of topographic and thematic mapping in terms of hardware, software, capabilities and processes.

Within a few years, about 300 computerized cartographic systems consisting of graphic input stations, output stations, CRTs, memories and minis will be used, the firm said.

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ICC a milgo company

ICC/MILGO will demonstrate high-speed and medium-speed modems, the 40+ Data Display System, and a data communication control, test and monitoring center. Qualified sales and technical personnel will be in attendance.

SOFTWARE INTERNATIONAL

Software International has sold over 500 systems to small, medium and large organizations in all industries who have installed IBM S/360/370, IBM S/3, or Honeywell 2000 series computers. We have a full line of Financial, Manufacturing and Banking Systems.

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On exhibit are interactive data communication terminals available for multi-year leasing, short-term rental or sale through GE's nationwide network of 93 service locations. Included are the General Electric TERMINET line (Models 30, 300 and 1200); and ADDS video display terminals. Maintenance management contract plans are also available through any of the 93 local service facilities.

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We've selected leading experts from around the country to guide each of our Seminars. They are highly accomplished specialists in their fields, experienced in presenting their techniques to industry and management. If you're involved in one of the areas shown, you should attend the EDP Seminar Series this fall. What you learn will benefit your company, your installation, and you.

Performance Evaluation and Improvement

Saul Stimler, author of *Data Processing Systems: Their performance, evaluation, measurement, and improvement* will lead this two-day seminar on measurement techniques designed to save your installation money. As well as system performance at your own installation, topics covered include: Criteria for quantifying performance, pencil and paper analysis of a system, Benchmarking techniques, Realtime, Batch and interactive time sharing systems.

Cost for the seminar, including continental breakfasts and luncheons and all course materials is $250.

New York	Hilton	May 10-11
Chicago	Hyatt Regency O'Hare	May 17-18
Wash., D.C.	Stouffer's National Center Inn	May 24-25

Data Communications Course #1010 – Practical Data Communications Systems & Concepts

Dr. Dixon Doll, the nationally recognized teleprocessing consultant will lead this two-day seminar on the newest advances in data communications. The course covers areas like SDLC, HiD-LoD, DDS, newly approved major revisions to WATS, and the impact of Satellite Carriers.

Total Cost, including workbook, reference materials luncheons and continental breakfasts is $350. Additional registrants from the same company qualify for the reduced rate of $300.

Write for Spring Schedule

Data Communications Course #1020 – Advanced Teleprocessing Systems & Design

Also led by Dr. Dixon Doll, this course is a follow-up to course #1010. Special emphasis is given to techniques that minimize operating costs in commercial data communications net works. This three-day seminar covers procedures, approaches, and algorithms for evaluating and cost-optimizing network operations. Total cost, including an extensive set of custom ized course materials, is $450. Additional registrants from the same company qualify for a reduced rate of $400

Write for Spring Schedule.

Legal Tools for Computer Contracting and Protection

Under the instruction of Roy N. Freed, a nationally known lawyer, author and educator in the field of computer law, you'll learn how to increase your advantage in dealing with vendors that supply your installation. As well as practical discussion and review of your own contracts, subject areas covered in this 2½-day seminar include: Negotiations, Contracts, Warranties, Avoidance and resolution of disputes, Security, Fraud, Taxation, and Techniques for handling any transaction. Cost for the entire seminar, including continental breakfasts, luncheons and all course materials is $325. Additional registrants from the same company are charged only $275.

Chicago	Hyatt Regency O'Hare	May 5-7
Seattle	Airport Hilton	May 5-7
New York	Summit Hotel	Jun. 23-25

How to Increase Programming Productivity

John W. Brackett, PhD, Vice President of SofTech, Inc., will lead this two-day seminar for technical managers on the state of the art of Software Engineering. Under his direction you will learn how to: create more precise and visible analysis and design; reduce integration problems; improve software reliability; incorporate visible outputs into the software development cycle; increase programmer productivity; and improve programming management methods. Topics covered include: Structured programming; Top-down analysis, design, implementation; and Chief Programmer teams. Cost for the entire seminar, including continental breakfasts, luncheons, and all course materials is $300. Additional registrants from the same company are charged only $250.

Wash., D.C.	Stouffer's National Center Inn	April 26-27
Atlanta	Hyatt Regency	May 3-4
St. Louis	Mariott at Lambert	May 24-25

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Former IBMer Testifies

Cost of 360/67 Software Quintupled

By a CW Staff Writer

NEW YORK – Software development costs for the IBM 360/67 time-sharing system reached five times the initial $14 million estimate by 1970 – and even then the system never provided the features originally promised, a former IBM executive testified recently at the U.S. vs. IBM antitrust trial here.

V. Orville Wright, IBM's director of time-sharing marketing from November 1964 until 1966, told the court IBM decided to develop a time-sharing product at the urging of several large customers.

Among those interested in time-sharing were the National Aeronautics and Space Administration and the Massachusetts Institute of Technology's Lincoln Laboratories, he added.

Wright was made head of the 360/67's marketing effort at the very start of the project, he said.

Serious Commitment

According to Wright, IBM had a serious commitment to the 360/67 – a system the Justice Department contends is a "fighting machine."

In defense of IBM's time-sharing product intentions, Wright said IBM had a number of R&D projects under way, including development of a reservations system for American Airlines known as Sabre, another such system for Pan American World Airways, several projects related to hardware relocation schemes and Quick Tran.

Wright cited development of the Blaauw Box, a 24-bit relocation register, as the breakthrough that finally made the 2065 CPU, chosen for use in the 360/67, perform time-sharing functions.

Government attorney Peter Goldberg attempted to show inside dissensions over introduction of the 360/67 as a standard product by eliciting from the witness the fact that neither Manufacturing nor Product Test believed the product was ready. Wright, however, denied this was indicative of any serious problem with the system.

A little "peer pressure" was applied against the two divisions' managers, who refused to give their concurrence as part of IBM's normal clearance procedure, which "brought them into line," Wright said. No upper management pressure was ever exerted on those individuals, he added.

Codex Files Against Milgo, ICC; Joins Yellow Freight in Milgo Suit

NEWTON, Mass. – Codex Corp. has filed suits against Milgo Electronics Corp. and International Communications Corp. (ICC) in response to actions filed previously by the defendants.

In a filing in U.S. District Court in Miami, Codex charged Milgo and ICC with infringement of its patent No. 3,887,768, sought to enjoin them from such infringement of its high-speed modems and required an accounting of damages.

Meanwhile, in the U.S. District Court in Boston, Codex joined with Yellow Freight Systems, Inc., a user of its modems, in filing for declaratory relief with respect to the patents involved in a suit filed against Yellow Freight Corp. by Milgo earlier this year [CW, Feb. 2].

In the earlier actions, Milgo filed a declaratory relief suit against Codex following Codex's demand that Milgo cease marketing certain modems it claimed infringed a Codex patent.

A Codex spokesman said the firm believes the Milgo Model 96 Multimode infringes its patent on signal structures for Double Side Band-Quadrature Carrier modulation.

A Milgo spokesman said the firm had no comment.

Milgo had also filed a suit against Yellow Freight, a user of Codex equipment.

EMM Expects Disk Drive Profits

SAN JOSE, Calif. – Electronic Memories & Magnetics Corp.'s (EMM) disk drive operations should turn around in the first quarter and show a profit in the second quarter, according to Fred Wolff, general manager of the unit.

Wolff said the firm will continue to service large OEMs as well as systems houses and sophisticated end users.

In other moves, EMM has opened a service and refurbishment center here as part of its restructuring of San Jose operations to concentrate on end-user media business.

The move followed the sale to Univac/ISS of its OEM media manufacturing and development capability and the transfer of its Caelus disk drive research facility in Sunnyvale to Ball Computer Products.

The joint venture agreement with Ball gives EMM manufacturing and marketing rights to the products in development, the firm said.

Univac/ISS will supply EMM with future media requirements as needed, EMM said.

New Registrations

MANUFACTURING DATA SYSTEMS, INC., 320 North Main St., Ann Arbor, Mich. 48104, a computer-aided manufacturing services firm, filed to register 750,000 shares of common, of which 380,000 are to be offered by the company and 370,000 shares by certain stockholders through underwriters headed by C.E. Unterberg, Towbin Co., 61 Broadway, New York, N.Y. 10006.

BURROUGHS CORP., Burroughs Place, Detroit, Mich. 48232, a computer manufacturer, filed to register $100 million of notes due 1981, to be offered for sale through underwriters headed by Kidder, Peabody & Co., Inc., 10 Hanover Square, New York, N.Y. 10006.

MOHAWK DATA SCIENCES CORP., 1599 Littleton Road, Parsippany, N.J. 07054, a computer manufacturer, filed to register $30 million of convertible subordinated debentures in exchange for all of the company's outstanding 5-1/2% convertible subordinated debentures, due 1994. Allen & Co., Inc., 30 Broad St., New York, N.Y. 10004, will be the dealer/manager.

DATA GENERAL CORP., Route 9, Southboro, Mass. 01772, a computer manufacturing firm, filed to register 14,658 shares of common, to be offered for sale from time to time by selling to stockholders at prices current at the time of sale. No underwriter is involved.

DIGITAL EQUIPMENT CORP., 146 Main St., Maynard, Mass. 01754, a computer manufacturer, filed to register 800,000 shares of common, to be offered for sale through underwriters headed by Lehman Brothers, Inc., One William St., New York, N.Y. 10004.

CRAY RESEARCH, INC., 7850 Metro Parkway, Suite 213, Minneapolis, Minn. 55420, a computer manufacturer, filed to register 660,000 shares of common, to be offered for sale by the company through underwriters represented by C.E. Unterberg; Towbin Co.; Piper, Jaffray & Hopwood, Inc.; and New Court Securities Corp.

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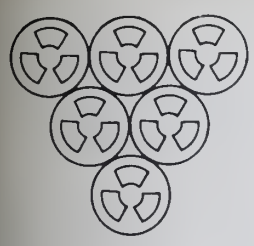
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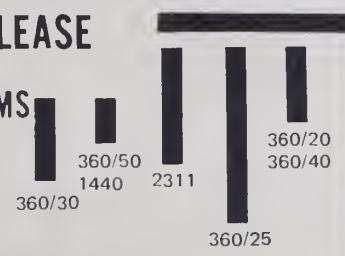
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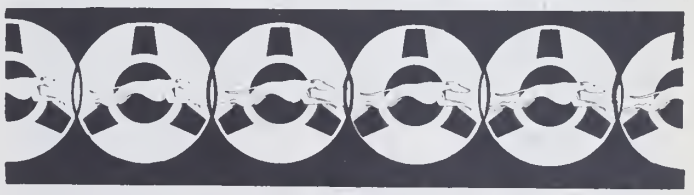
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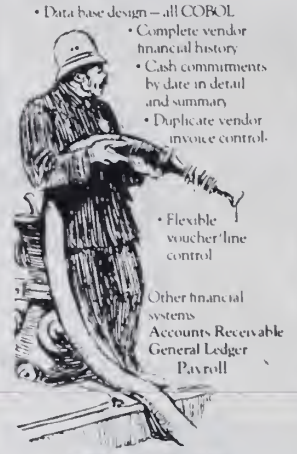
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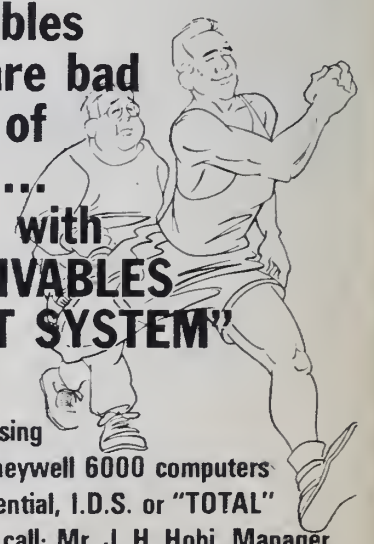
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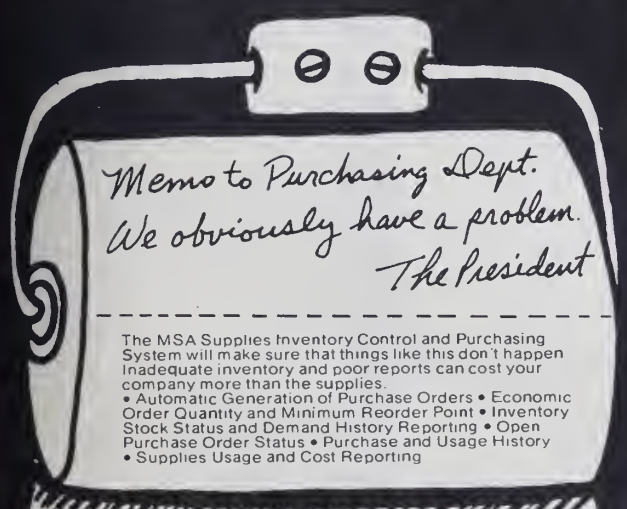
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Four of Six Remote-Computing Firms Come Out Ahead

Four out of six remote-computing services firms showed improved earnings and revenues in their recent financial statements.

Keydata Corp. scored record half-year results for the period ended Jan. 31, while Tymshare, Inc. showed record revenues and increased profitability for the year ended Dec. 31.

Rapidata, Inc.'s earnings also rose for the year and National CSS, Inc. (NCSS) scored record revenues and earnings for the third quarter ended Nov. 30.

But results of Remote Computing Corp. (RCC) and On-Line Systems, Inc. in the third-quarter and nine month were reduced compared with those of the same periods last year.

Keydata Record Six Months

At Keydata, the six-month earnings, including special credits, topped those of the entire fiscal 1975, President L. Edwin Donegan Jr. said.

The firm earned $481,000 or 18 cents a share compared with $136,000 or 5 cents a share in the same six months last year. Revenues rose to $7.3 million compared with $6.4 million in the year-ago period.

For the second quarter, Keydata earned $272,000 or 10 cents a share compared with $102,000 or 4 cents in the year-ago period.

Special credits for the quarter were $127,000 compared with $46,000 a year ago while in the six months these rose to $224,000 compared with $61,000.

Revenues in the quarter rose to $7.3 million compared with $6.4 million in the same period last year for the Wellesley, Mass., firm.

At Rapidata, headquartered in Fairfield, N.J., President Robert J. O'Brien credited much of the firm's success last year to its Rapidten computer systems.

Rapidata's earnings for the three months totaled $313,313 or 17 cents a share compared with $184,590 or 10 cents a share in the same period last year. Revenues rose to $3.7 million compared with $3.1 million.

For the year, Rapidata earned nearly $1.3 million or 70 cents a share compared with $514,237 or 28 cents last year. Tax credits totaled $135,000 in 1975 and $55,000 in 1974.

Revenues jumped to $14.8 million compared with $11.5 million in 1974.

At NCSS, third-quarter earnings rose 30% to $548,200 or 50 cents a share compared with $420,100 or 38 cents a share in the same period last year.

Revenues totaled $9 million compared with $8 million in the same 1975 fiscal period.

The year-ago figures were restated to conform with changes in the method of accounting for software and system development costs, the firm said.

For the nine months, NCSS earned $1.5 million or $1.41 a share compared with $1.4 million or $1.26 a share in the same period last year.

Revenues rose to $26.3 million compared with $24.7 million in the year ago nine months.

Tax credits for the nine months totaled $83,000 compared with $63,000 in the year-ago period.

During November the firm signed a four-year contract, valued at a minimum of $4.8 million, to provide time-sharing services to the New York Telephone Co.

At Tymshare in Cupertino, Calif., revenues reached an all-time high of $56.4 million compared with $46.5 million last year.

Earnings rose 46% to $4.7 million or $1.22 a share compared with $3.3 million or 89 cents a share in 1974.

RCC Quarter Down

RCC's third quarter was profitable, but down from the year-ago results for the Palo Alto, Calif., firm.

Earnings at RCC were $54,000 or 7 cents a share compared with $142,000 or 20 cents a share in the same period last year.

Tax credits amounted to $23,000 in the recent period compared with $65,000 in the year-ago period.

Quarterly revenues at RCC dropped to nearly $1.8 million compared with $1.9 million in the same period last year.

The 1975 results have been restated to give effect to writeoffs of certain development costs, the firm said.

For the nine months, RCC's earnings were $109,000 or 15 cents a share compared with $122,000 or 17 cents a share in the year-ago period.

The special credits were $42,000 compared with $65,000 in 1975.

Revenues rose to $5.5 million compared with $4.9 million in the same period last year.

On-Line Systems, Inc. in Pittsburgh posted record revenues for its third quarter, but earnings failed to keep pace.

Revenues in the quarter rose to $3.2 million compared with $2.9 million a year ago, but earnings dropped to $246,547 or 29 cents a share compared with $289,006 or 35 cents a share in the year-ago period.

For the nine months, earnings dipped sharply to $459,960 or 54 cents a share compared with nearly $1.2 million or $1.40 a share in the same period last year.

Revenues also declined, to $8.3 million compared with $9 million in the year-ago nine months.

Quarter Helps Tally Report Record Year

KENT, Wash. – Aided by a fourth-quarter turnaround, Tally Corp. scored record earnings and revenues for the year.

For the year, the printer maker's revenues rose to $21.5 million from $17.8 million last year.

Earnings jumped to $1 million or 43 cents a share, including a $412,000 special credit, compared with $33,000 or 1 cent a share last year.

During the fourth quarter, the firm tallied $6.2 million in revenues compared with $4.8 million in the same period last year.

Earnings totaled $479,000 or 20 cents a share, including a $274,000 tax credit, compared with a loss of $78,000 or 3 cents a share in the year-ago period.

President Leslie A. Larsen said "our international line printer business increased significantly, our shift in profit mix produced greater profits and we believe the base established in 1975 will lead to a successful 1976."

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DOCS functions concurrently with EDOS, GRASP, DOS/RS, POWER II, ASAP, POWER/VS, and ITEL's DOS/VS executing on a S/360 and will enhance the system operation by providing improved facilities for the use of these packages while DOCS is controlling SYSLOG.

DOCS is available from C F S, Inc. as a licensed program product and may be leased monthly, yearly or on a one-time lease arrangement for $175.00, $1,890.00 and $5,670.00 respectively. All three lease plans include free maintenance for as long as DOCS is installed.

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NO USER PARTITION REQUIREMENT
DOCS executes in its own pseudo-partition thus allowing the user unrestricted use of the problem program partitions.

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Earnings Reports

COMPUTER DIMENSIONS
Year Ended Dec. 31

	1975	1974
Shr Ernd	$.71	$.47
Revenue	11,654,122	10,535,680
Disc Op	.....	(84,773)
Tax Cred	520,200	320,318
Earnings	1,115,232	715,406

COMTEN
Year Ended Dec. 31

	a1975	1974
Shr Ernd	$.42	$.36
Revenue	18,500,000	13,705,000
Tax Cred	472,000	362,000
Earnings	1,000,000	780,000

a-Estimated.

CINCINNATI MILACRON
Year Ended Dec. 31

	1975	a1974
Shr Ernd	$2.69	$2.78
Revenue	450,188,000	452,785,000
Spec Cred	.....	b1,840,000
Earnings	9,946,000	10,259,000
3 Mo Shr	.38	.20
Revenue	106,798,000	117,091,000
Earnings	1,410,000	782,000

a-Restated to reflect change in accounting for foreign currency translation. b-Cumulative effect on prior years of accounting change.

DATAPOINT
Three Months Ended Jan. 31

	1976	1975
Shr Ernd	$.51	$.53
Revenue	16,652,000	10,839,000
Tax Cred	.....	390,000
Earnings	1,389,000	1,095,000
6 Mo Shr	1.07	.98
Revenue	31,104,000	20,913,000
Tax Cred	495,000	639,000
Earnings	2,892,000	1,993,000

INFOREX
Year Ended Dec. 28

	1975	a1974
Shr Ernd	$.54	$.23
Revenue	56,998,000	51,985,000
Spec Cred	339,000	119,000
Earnings	1,527,000	633,000
3 Mo Shr	.33	.13
Revenue	15,536,000	16,352,000
Spec Cred	281,000	27,000
Earnings	943,000	360,000

a-Restated to reflect accounting change for foreign currency translations.

INSTRUMENT SYSTEMS
Three Months Ended Dec. 31

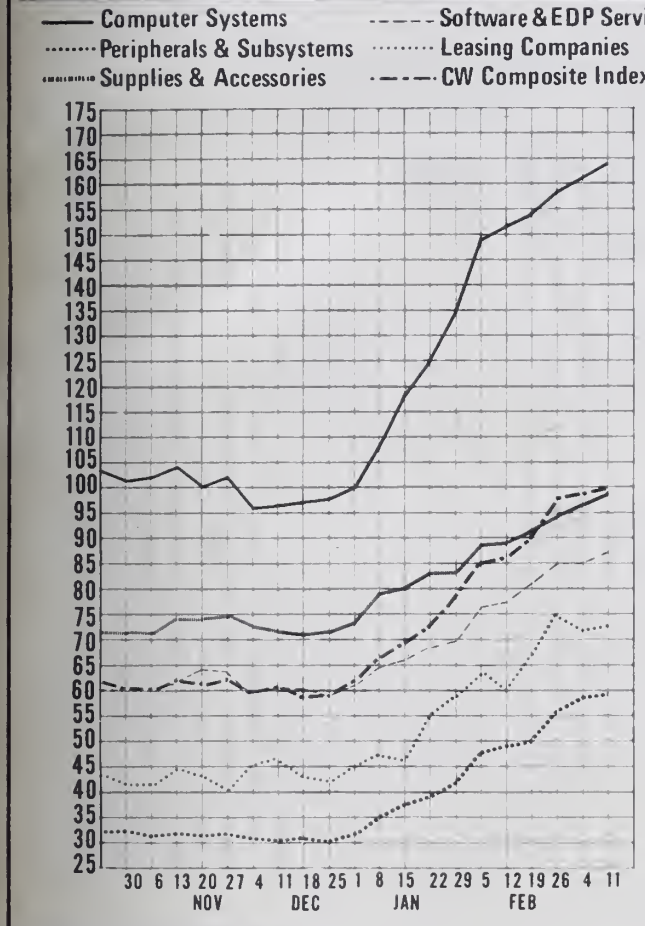
	1975	1974
Shr Ernd	.....	$.04
Revenue	$50,188,000	49,411,000
Spec Item	(165,000)	50,000
Earnings	(1,594,000)	382,000

MOHAWK DATA SCIENCES
Three Months Ended Jan. 31

	1976	a1975
Shr Ernd	$.17	.....
Revenue	40,022,000	$42,373,000
Disc Op	.....	(15,000)
Tax Cred	1,030,000	.....
Earnings	1,175,000	(4,031,000)
9 Mo Shr	.53	.....
Revenue	120,646,000	125,597,000
Disc Op	141,000	(668,000)
Spec Item	d2,265,000	b(4,285,000)
Earnings	3,610,000	(14,505,000)

a-Restated. b-Cumulative effect of accounting change. d-From tax-loss carryforward.

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Computerworld Stock Trading Summary

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CLOSING PRICES WEDNESDAY, MARCH 10, 1976

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

X		1975-76 RANGE (1)	CLOSE MAR 10 1976	WEEK NET CHNGE	WEEK PCT CHNGE
N	BURROUGHS CORP	62-109	104 3/8	+1 7/8	+1.8
O	COMPUTER AUTOMATION	2- 19	18 1/2	+2 1/8	+12.9
N	CONTROL DATA CORP	11- 26	24 3/8	+ 1/8	+0.5
N	DATA GENERAL CORP	10- 52	50 3/4	-1 1/2	-2.8
O	DATAPOINT CORP	6- 38	37 1/4	+1 3/4	+4.9
O	DIGITAL COMP CONTROL	1- 4	3 3/4	0	0.0
N	DIGITAL EQUIPMENT	46-176	175 1/2	+4 1/2	+2.6
N	ELECTRONIC ASSOC.	2- 5	4 1/2	0	0.0
A	ELECTRONIC ENGINEER.	5- 16	15 1/8	- 7/8	-5.4
N	FOXBORO	23- 42	36 1/4	+2 3/4	+8.2
O	GENERAL AUTOMATION	4- 14	9	- 3/4	-7.6
C	GRI COMPUTER CORP	1- 1	1	0	0.0
N	HEWLETT-PACKARD CO	58-120	109 5/8	+1 7/8	+1.7
N	HONEYWELL INC	22- 56	52	-1	-1.8
N	IBM	158-264	261 3/4	+2 3/8	+0.9
O	MANAGEMENT ASSIST	1- 1	1 1/4	- 1/8	-9.0
O	MEMOREX	1- 26	23 3/8	-1	-4.1
O	MICRODATA CORP	2- 22	21 1/4	-1	-4.4
C	MODULAR COMPUTER SYS	5- 19	11 1/2	+2 1/2	+27.7
N	NCR	15- 39	26 7/8	- 3/4	-2.7
C	PRIME COMPUTER INC	2- 10	9 3/4	+1 1/2	+18.1
N	PERKIN-ELMER	16- 30	22 1/2	- 1/4	-1.0
N	RAYTHEON CO	26- 59	49	+ 1/2	+1.0
N	SPERRY RAND	26- 49	47 5/8	+2 5/8	+5.8
O	SYCOR INC	5- 31	20 1/2	+1 1/4	+4.5
A	SYSTEMS ENG. LABS	1- 10	10 1/4	+ 5/8	+6.4
N	VARIAN ASSOCIATES	7- 18	16 1/4	- 1/8	-0.7
N	WANG LABS.	7- 20	18 1/4	- 5/8	-3.3

LEASING COMPANIES

C	COMDISCO INC	1- 9	8 1/2	- 1/4	-2.8
A	COMMERCE GROUP CORP	2- 4	3 1/8	+ 1/8	+4.1
A	COMPUTER INVSTRS GRP	1- 2	1 5/8	- 1/8	-7.1
M	DATRONIC RENTAL	1- 1	1/2	0	0.0
A	DCL INC	0- 1	3/4	+	+9.0
N	DPF INC	3- 7	6	0	0.0
C	EDP RESOURCES	1- 2	1	0	0.0
A	GRANITE MGT	1- 5	4 1/2	0	0.0
A	GREYHOUND COMPUTER	2- 5	4 1/2	+ 3/8	+9.0
N	ITEL	3- 13	12 1/2	+2 1/8	+20.4
N	LEASCO CORP	4- 14	11 5/8	+1 1/8	+10.7
O	LEASPAC CORP	0- 1	1/4	0	0.0
O	LECTRO MGT INC	1- 1	1/8	0	0.0
C	NRG INC	0- 4	1/4	0	0.0
A	PIONEER TEX CORP	2- 9	7 7/8	- 1/4	-3.0
A	ROCKWOOD COMPUTER	1- 1	1/8	0	0.0
N	U.S. LEASING	7- 14	10	0	0.0

SOFTWARE & EDP SERVICES

O	ADVANCED COMP TECH	1- 1	3/4	- 1/8	-14.2
A	APPLIED DATA RES.	1- 10	3	+ 1/8	+4.3
N	AUTOMATIC DATA PROC	29- 65	58 3/4	-2 1/2	-4.0
C	BRANDON APPLIED SYST	1- 1	1/4	+ 1/8	+100.0
O	COLEMAN AMERICAN COS	4- 6	4 1/2	- 1/8	-2.7
C	COMPUTER DIMENSIONS	2- 6	5 3/4	+ 1/4	+4.5
C	COMP ELECTION SYSTMS	3- 7	5 1/2	0	0.0
C	COMPUTER HORIZONS	1- 1	1/2	0	0.0
C	COMPUTER NETWORK	1- 5	4	0	0.0
N	COMPUTER SCIENCES	2- 8	6 3/4	- 1/4	-3.5
C	COMPUTER TASK GROUP	1- 1	1	0	0.0
O	COMPUTER USAGE	2- 4	4 1/4	+ 7/8	+25.9
C	COMSHARE	2- 4	3 1/8	+ 1/4	+8.6
O	DATATAB	1- 2	1	0	0.0
A	ELECT COMP PROG	1- 1	1/8	0	0.0
N	ELECTRONIC DATA SYS.	11- 28	14 1/8	- 3/8	-2.5
O	INFONATIONAL INC	1- 1	1/8	0	0.0
C	IPS COMPUTER MARKET.	1- 1	1 1/8	0	0.0
O	KEANE ASSOCIATES	2- 3	3 1/8	- 1/4	-7.4
O	KEYDATA CORP	2- 5	4	- 3/8	-8.5
C	LOGICON	3- 5	4 3/8	+ 1/8	+2.9
A	MANAGEMENT DATA	1- 3	2 1/2	0	0.0
A	NATIONAL CSS INC	6- 25	21	-2 7/8	-12.0
O	NATIONAL COMPUTER CO	1- 1	1/8	0	0.0
A	ON LINE SYSTEMS INC	8- 22	20 3/4	- 7/8	-4.0
N	PLANNING RESEARCH	2- 6	4 1/2	+ 1/4	+5.8
O	PROGRAMMING & SYS	1- 1	5/8	0	0.0
O	RAPIDATA INC	2- 5	4 3/8	- 1/4	-5.4
O	REYNOLDS & REYNOLD	10- 24	20 1/2	+ 1/2	+2.5
O	SCIENTIFIC COMPUTERS	1- 1	3/4	0	0.0
C	SIMPLICITY COMPUTER	1- 1	1	0	0.0
O	TYMSHARE INC	7- 28	25 1/4	+ 1/8	+0.4
A	URS SYSTEMS	2- 5	4 1/4	+ 1/4	+6.2
N	WYLY CORP	2- 7	6	- 1/8	-2.0

PERIPHERALS & SUBSYSTEMS

N	ADDRESSOGRAPH-MULT	4- 13	10 3/4	- 5/8	-5.4
O	ADVANCED MEMORY SYS	1- 10	9 1/4	+ 3/8	+4.2
N	AMPEX CORP	3- 8	8	+ 5/8	+8.4
O	ANDERSON JACOBSON	1- 4	3 1/8	- 1/8	-3.8
O	BEEHIVE MEDICAL ELEC	1- 5	4 3/4	0	0.0
A	BOLT,BERANEK & NEW	5- 13	9 7/8	+1 3/4	+21.5
N	BUNKER-RAMO	4- 8	6 5/8	- 1/2	-7.0
A	CALCOMP	3- 7	5 7/8	+ 1/8	+2.1
O	CAMBRIDGE MEMORIES	1- 5	4 3/8	+1 5/8	+59.0
N	CENTRONICS DATA COMP	7- 35	28 7/8	-1 3/4	-5.7
O	CODEX CORP	15- 42	39 1/2	+2	+5.3
C	COGNITRONICS	1- 2	1 1/4	- 1/8	-9.0
O	COMPUTER COMMUN.	1- 3	3 5/8	- 1/8	-3.3
O	COMPUTER CONSOLES	3- 7	5 3/4	- 1/4	-4.1
A	COMPUTER EQUIPMENT	1- 3	2 3/8	- 1/8	-5.0
O	COMPUTER MACHINERY	1- 2	1 7/8	- 1/4	-11.7
C	COMPUTER TRANSCEIVER	1- 2	2 3/8	+ 1/4	+11.7
C	COMTEN	2- 8	7 1/4	+ 3/8	+5.4
N	CONRAC CORP	12- 30	23 3/8	- 7/8	-3.6

O	DATA ACCESS SYSTEMS	1- 3	2 5/8	+ 1/8	+5.0
O	DATA 100	5- 16	10 3/8	+ 3/4	+7.7
A	DATA PRODUCTS CORP	2- 11	10 3/4	+ 1/8	+1.1
O	DATA TECHNOLOGY	1- 3	2 1/4	- 1/8	-5.2
O	DATUM INC	1- 2	2	+ 1/4	+14.2
O	DECISION DATA COMPUT	2- 7	4 1/8	- 1/4	-5.7
O	DELTA DATA SYSTEMS	1- 1	1/4	0	0.0
O	DIZAN CONTROLS	1- 1	1	+ 1/4	+33.3
N	ELECTRONIC M & M	1- 3	2 7/8	+ 1/8	+4.5
O	FABRI-TEK	1- 1	7/8	- 1/4	-22.2
O	GENERAL COMPUTER SYS	1- 2	1 3/4	0	0.0
N	HAZELTINE CORP	3- 12	10 1/8	-1 3/8	-11.9
N	HARRIS CORP	18- 46	43 3/4	- 7/8	-1.9
A	INCOTERM CORP	3- 18	15 3/8	-2 3/8	-13.3
O	INFOREX INC	2- 7	6 3/4	+ 1/2	+8.0
O	INFORMATION INTL INC	8- 18	17 1/4	+ 1/4	+1.4
O	INTEL CORP	21-102	100	+3 1/2	+3.6
A	LUNDY ELECTRONICS	3- 7	5 7/8	0	0.0
O	MSI DATA CORP	3- 10	6 5/8	- 1/4	-3.6
A	MILGO ELECTRONICS	8- 24	17 3/8	+ 1/4	+1.4
N	MOHAWK DATA SCI	1- 7	6 5/8	- 3/8	-5.3
C	OPTICAL SCANNING	1- 3	1 1/2	0	0.0
O	PENRIL CORP	1- 2	2 1/4	+ 1/2	+28.5
A	PERTEC CORP	2- 8	6 1/2	- 1/4	-3.7
A	PETTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	1- 1	1 1/2	0	0.0
O	QUANTOR CORP	2- 6	3 3/4	- 5/8	-14.2
O	RECOGNITION EQUIP	2- 10	9 7/8	+1 5/8	+19.6
N	SANDERS ASSOCIATES	3- 11	10 1/2	+ 7/8	+9.0
C	SCAN DATA	1- 4	2	- 1/4	-7.6
O	STORAGE TECHNOLOGY	6- 17	12 7/8	+2 1/8	+19.7
O	T BAR INC	3- 10	9	+ 1/4	+2.8
O	TALLY CORP.	1- 6	5 1/8	+ 1/8	+2.5
O	TEC INC	1- 5	5	+ 1/2	+11.1
N	TEKTRONIX INC	18- 60	57 1/2	+3 1/4	+5.9
N	TELEX	1- 5	4	- 1/4	-5.8
O	WANGCO INC	4- 15	14 3/8	+ 1/4	+1.7
O	ATLTEK INC	1- 4	2	0	0.0

SUPPLIES & ACCESSORIES

O	ADVANCED SYSTEMS INC	1- 3	2 1/4	+ 1/2	+28.5
O	BALTIMORE BUS FORMS	4- 5	4 3/4	0	0.0
A	BARRY WRIGHT	5- 9	8 1/4	+ 1/8	+1.5
O	CYBERMATICS INC	0- 1	3/8	0	0.0
A	DATA DOCUMENTS	29- 42	40 1/4	+ 1/2	+1.2
O	DUPLEX PRODUCTS INC	12- 25	19 1/8	+1 5/8	+9.2
N	ENNIS BUS. FORMS	5- 8	7 1/4	+ 1/8	+1.7
C	GRAHAM MAGNETICS	5- 13	10	-1	-9.0
O	GRAPHIC CONTROLS	8- 21	17 1/2	+ 3/4	+4.4
N	3M COMPANY	43- 68	59 1/8	- 1/8	-0.2
C	MOORE CORP LTD	39- 51	46 1/4	0	0.0
N	NASHUA CORP	9- 22	14 1/4	- 5/8	-4.2
C	STANDARD REGISTER	11- 20	18	+1 1/4	+7.4
C	TAB PRODUCTS CO	4- 8	7 1/4	- 1/4	-3.3
N	UARCO	17- 25	23 1/4	- 1/8	-0.5
C	VANTER GRAPHICS CORP	4- 8	7 1/4	- 1/4	-3.3
A	WABASH MAGNETICS	3- 8	7	+ 1/4	+3.7
N	WALLACE BUS FORMS	15- 25	23 1/4	- 1/8	-0.5

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
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